MISSOURI BOTANICAL GARDEN
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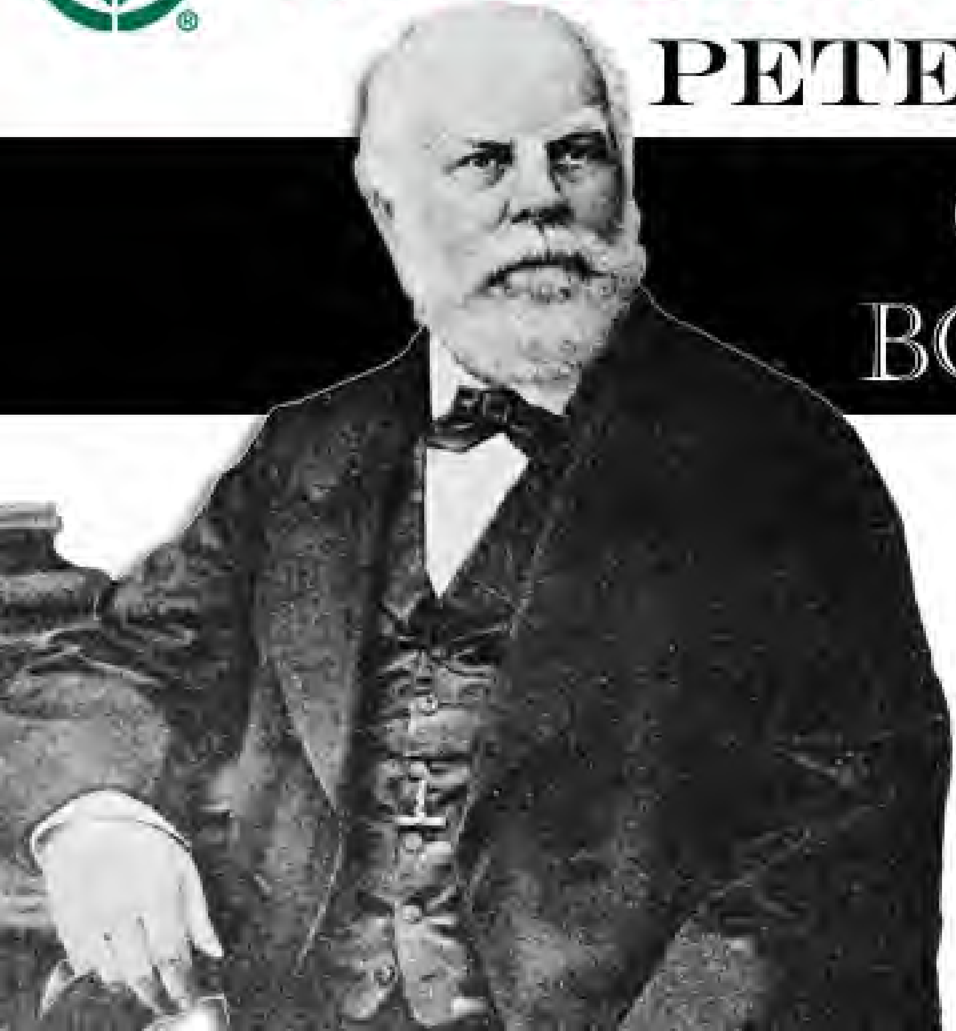


GEORGE ENGELMANN BOTANICAL NOTEBOOKS

Pagination Note:
Since many of the items lack a specific page number, the page number displayed online refers to the sequentially created number each item was given upon cataloging the materials.

Geol. Pos. & Loc.—Mountain Limestone, Indiana.

POLYPORA RIGIDA, Prout.

Polyzoum a semicircular, flat, flabelliform expansion, radiating from a central axis.

Longitudinal rays small, sharply defined; straight, rigid and wire-like upon the reverse; seldom branched, sometimes anastomosing; mostly branching from dissepiments, by which the fenestrules are much diminished in size.

Dissepiments, on the reverse, small and sharply defined; mostly opposite, in straight or curved lines; sometimes alternate.

Fenestrules large, longer than broad, mostly quadrangular, sometimes rounded at angles and more or less irregular in size. On the medallion face the fenestrules are crowded by the growth of the cells, and are more or less oblong oval.

RETEPORA HAMILTONENSIS, Prout.

Bryozoum a broad, funnel-shaped expansion, with longitudinal rays frequently branching and rapidly diverging so as to give an explanate or flat form to the funnel, which only shows the reverse or lower surface.

echinospora vera

macrospores 0.45
Gay 0.44 – 0.50
Braun 0.42 – 0.47

Microspores 0.032
Gay 0.032 – 0.033
Braun 0.031 – 0.034

Chalices or *cells large,* upon the two sides of a fine line or keel, usually two, sometimes one, and sometimes three to each fenestrule.

Reverse unknown.

Geol. Pos. & Loc.—This beautiful and delicate species was found on the same slab with the *F. nodosa*, and belongs to the Hamilton Group.

FENESTELLA BIFURCATA, Prout.

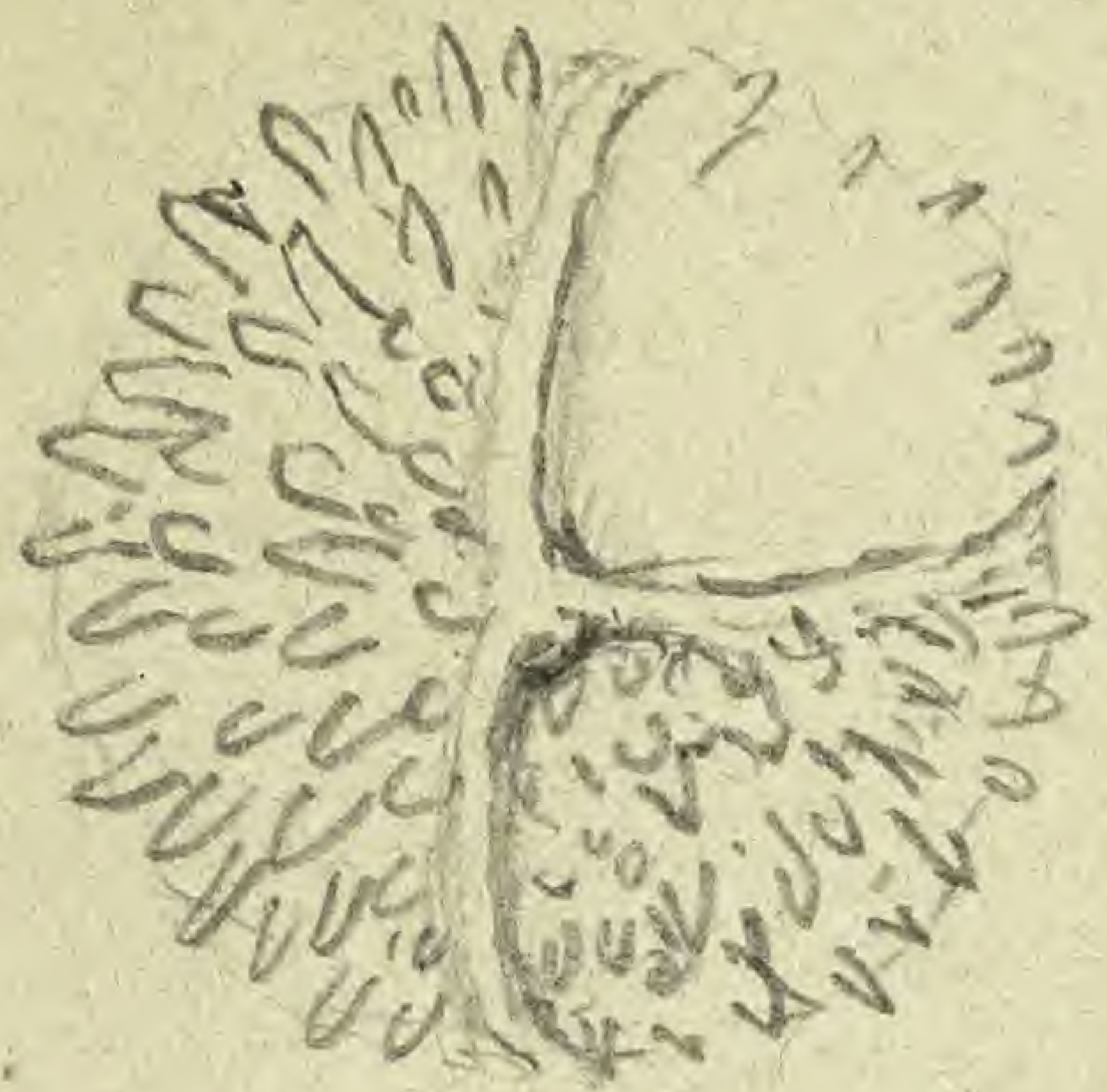
Polyzoum or *Bryozoum*, a fan-like expansion, with large longitudinal rays and oscules distinctly visible to the naked eye.

Longitudinal rays large, basaltiform, with a middle keel and two rows of chalices; bifurcating seldom towards the base, but frequently and mostly in opposite series towards the middle; four to five in each series.

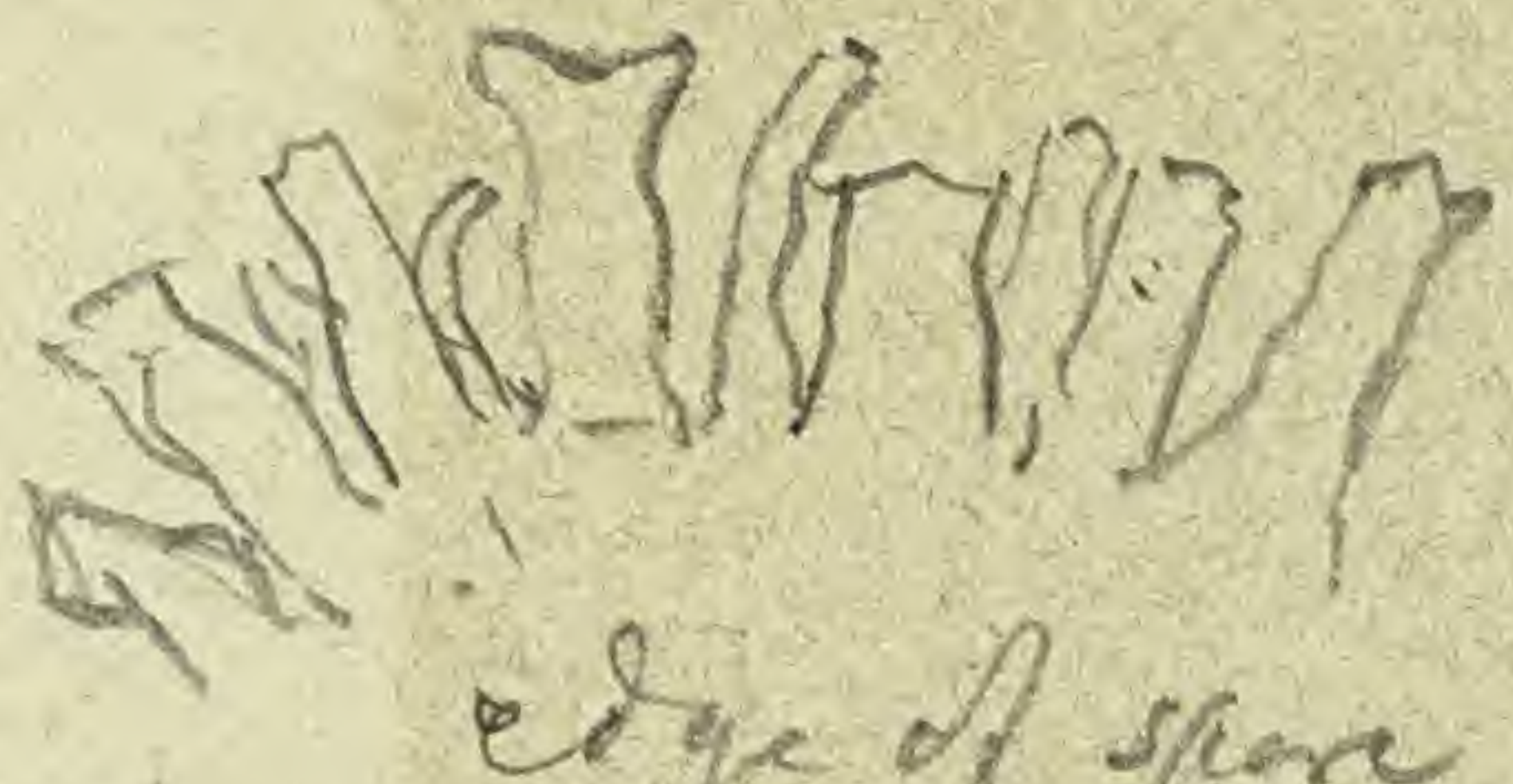
13579

Isoetes echinospora Nov 24 1863

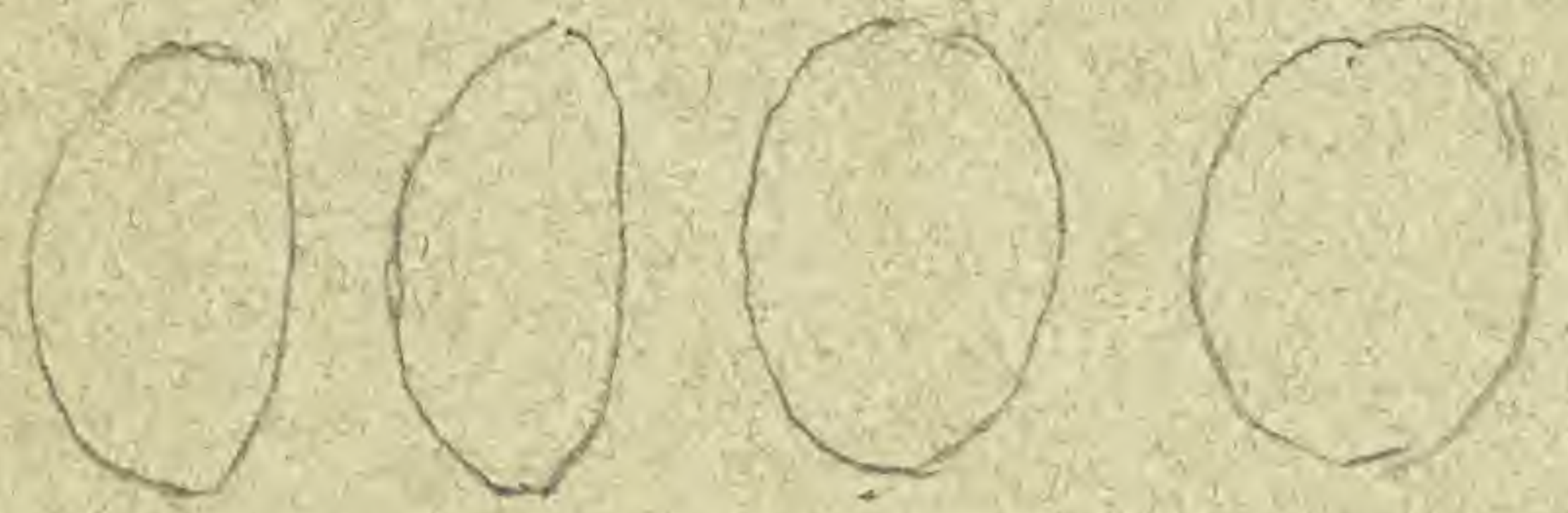
St Andreal 23 Aug 1861



Spirulae on lower (not ribbed) half apparently larger.

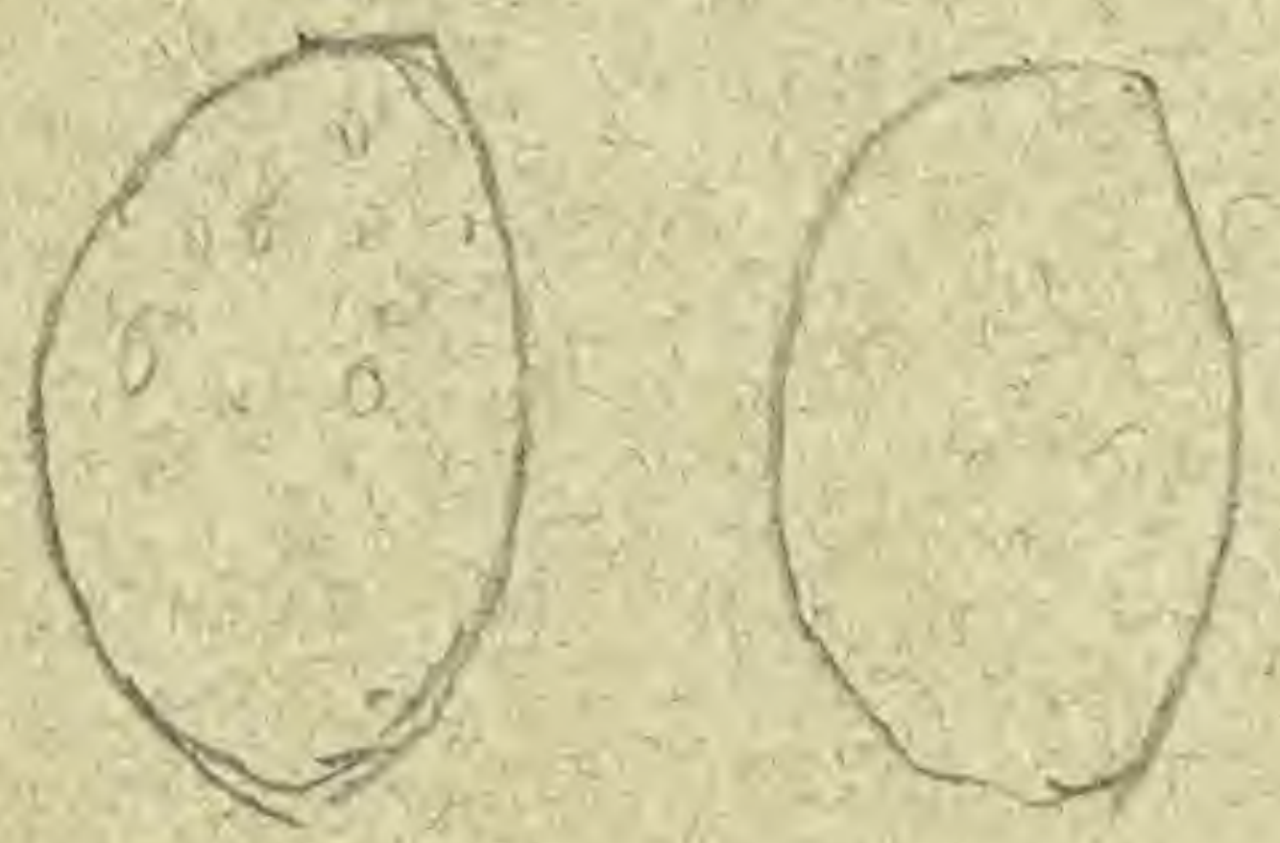


edge of spore ×153



×415

male spores dry



wet

Size of spores ×60.

12½ – 12 lin

= 0,21 – 0,22 lin

27 – 28 mm = 0,45 – 0,47 mm

13580

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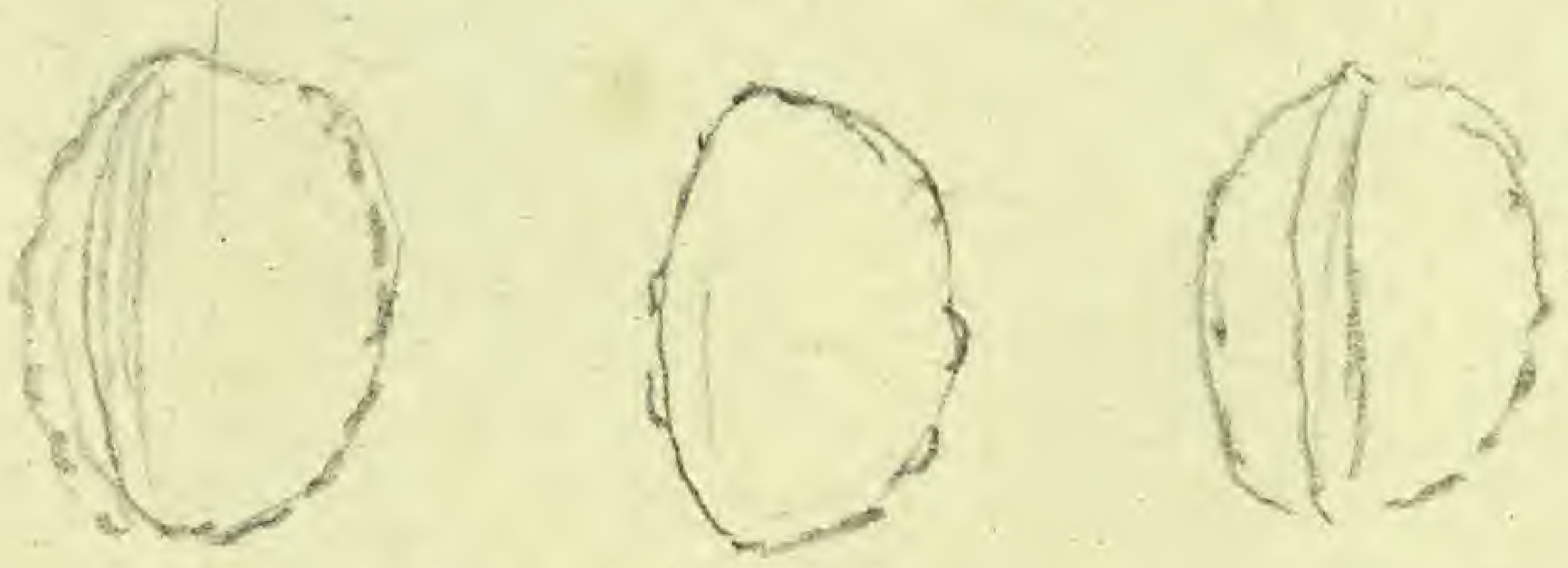
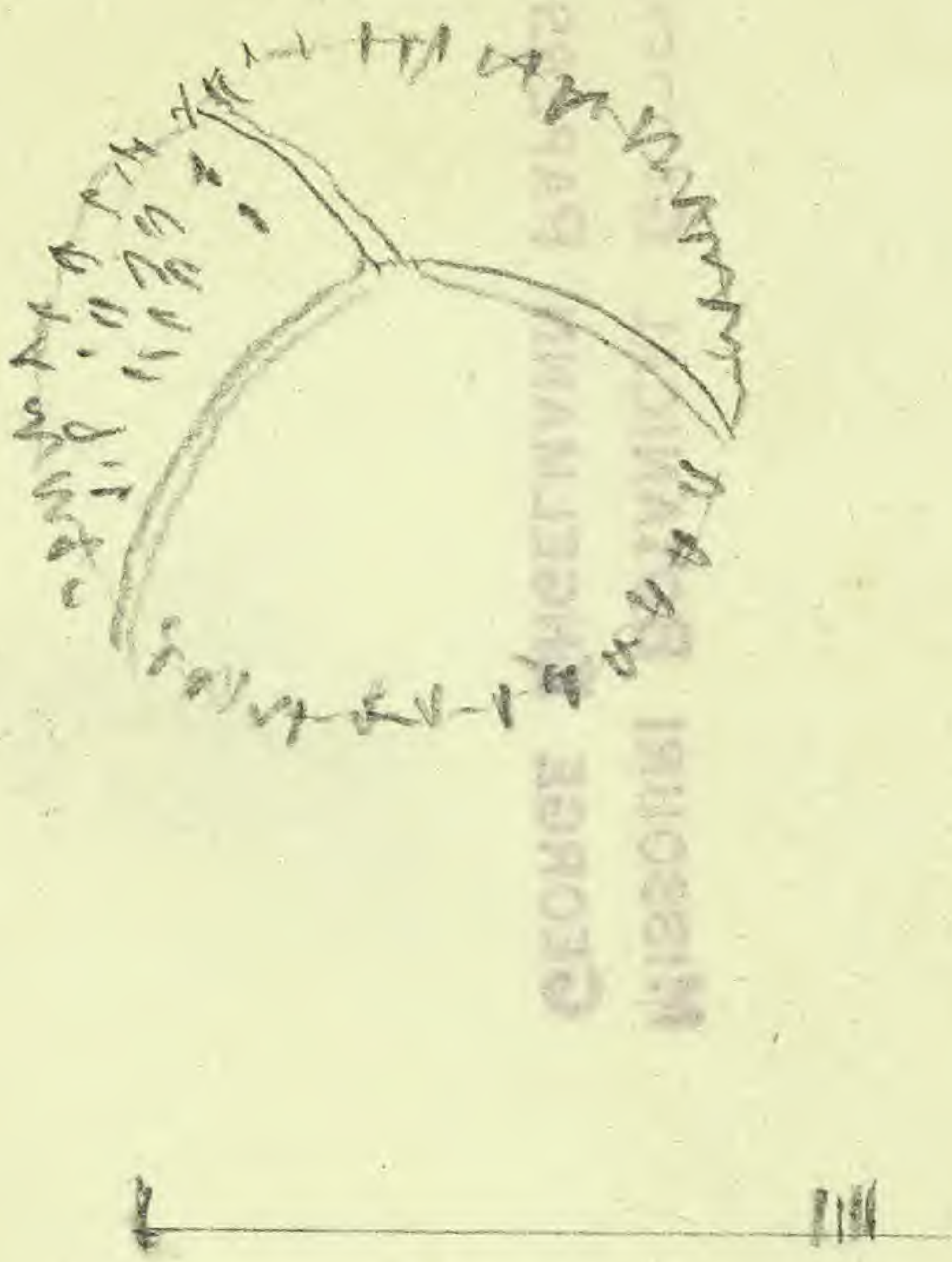
CHEMIST

Isoetes echinospora Sept 16 1866

X415 St Andréol J. Gay Aug 23 1861

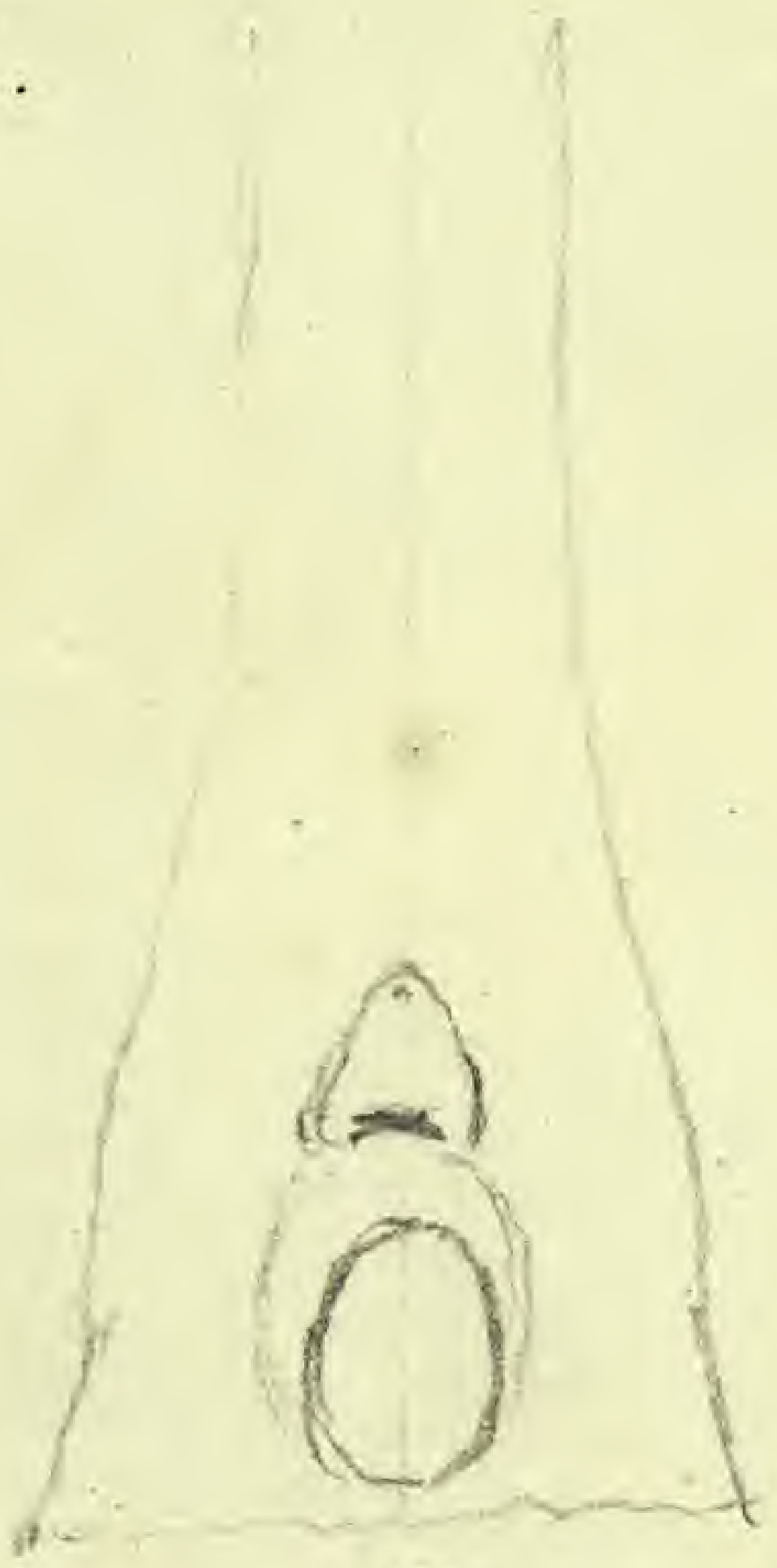


0.032 – 0.033 mm



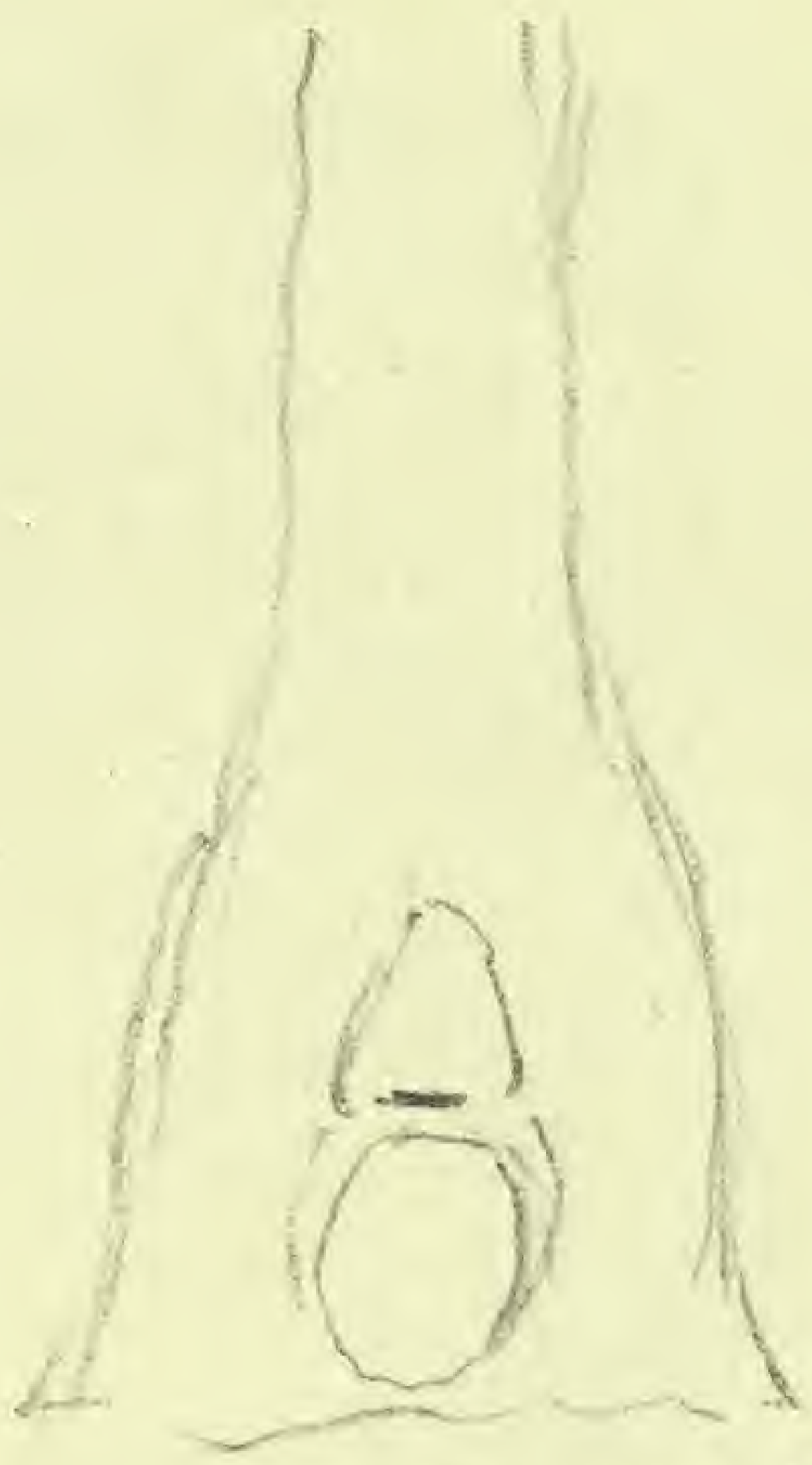
$\frac{27.5 - 30}{60}$ mm

= 0.44 – 0.50



androsporangia

ligula very broad



gynosporangia extern

Some gynosporangia similar others (perhaps the most external ones)

13581

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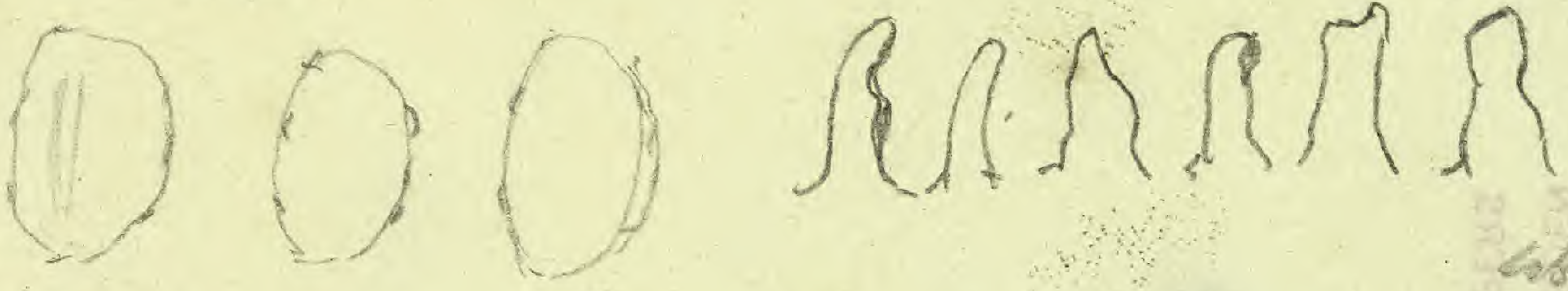
Isoetes echinospora Sept 16 1866

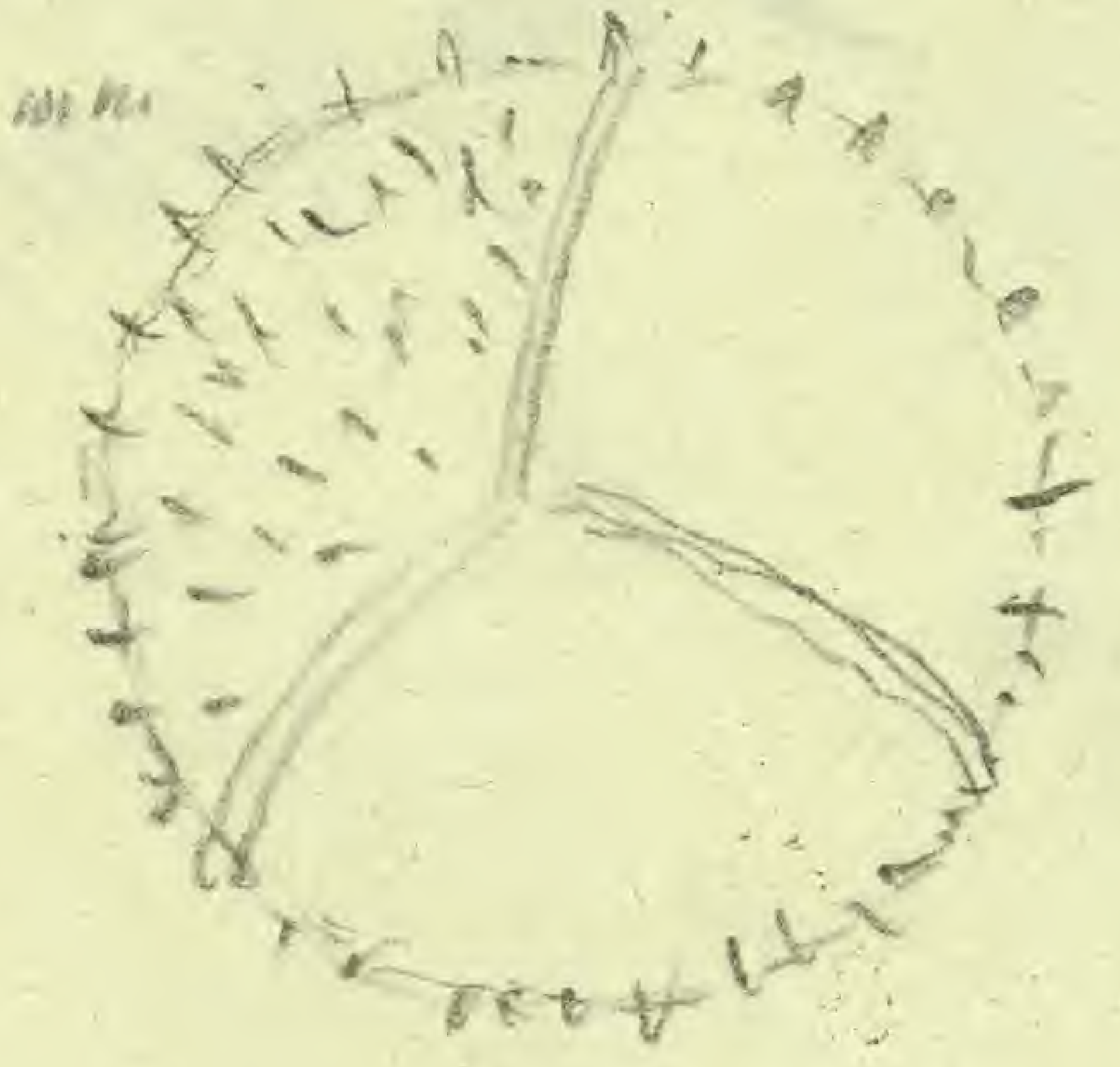
Titisee, Schwarzwald, Solms Aug 1859
(A Braun mis)

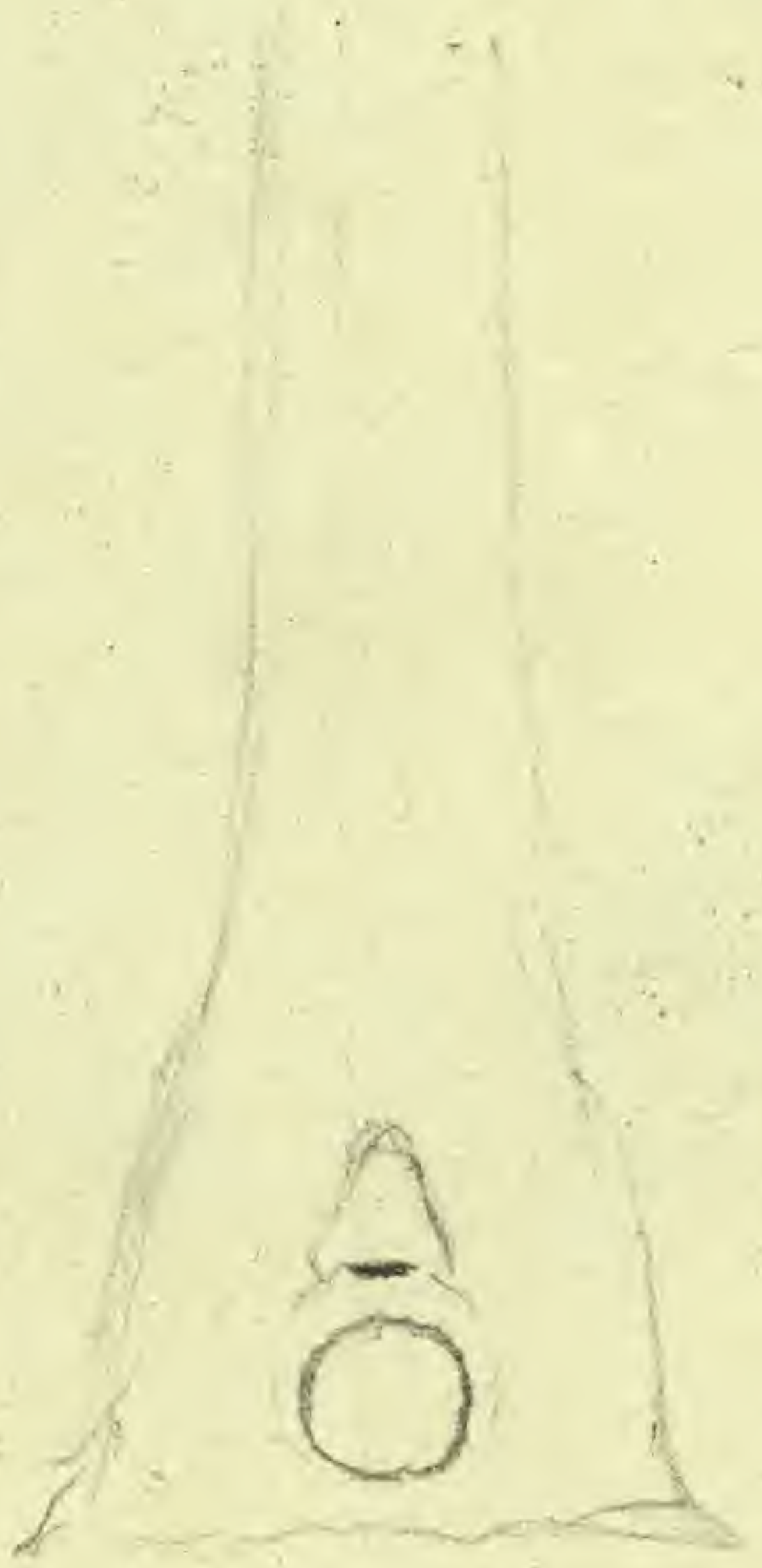
x 415



androspores scarcely verrucose, 0.031 – 0.034 mm

spines abt 0.06 mm long





diam. of spores

$\frac{0.26-28}{60} = 0.42 - 0.47$ mm

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13582

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$00/900/1001/05/251

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Rec^d Dec 24th 1866
Ans. Dec 25

In "Observations on some New England Plants" in Amer. Journ. Sci. (Sept.) 1848, p. 224, I find I have determined the date of my finding the *Isoetes* of Echo Lake as follows:—

"In 1844, I was so fortunate as to meet with it" (the notice is of *Subularia*) growing abundantly in about a foot of water, in company with *Isoetes lacustris*, on the gravelly bottom of Echo Lake, Franconia Notch, New Hampshire".

Dear Sir

The above answers fully the enquiry you made, as to my finding the Isoetes. But I am unable to say that the plant really was *lacustris* — not having at any time studied the genus; its specific determination must depend therefore on the (best) authority of Prof. Braun.

I never collected any *Isoetes* except at Franconia and Medford — it falling in my way, each time when my mind was occupied with different plants.

13583

Finding that I possess the Inaug. dissertation of Meyer on Juncus, & having no doubt that it may have more opportunity of possible usefulness in your hands — I beg herewith to send it — with my best thanks for your remembrance of me in distribution of the Herb. Norm: juncorum.

With respect
truly yours
E. Tuckerman

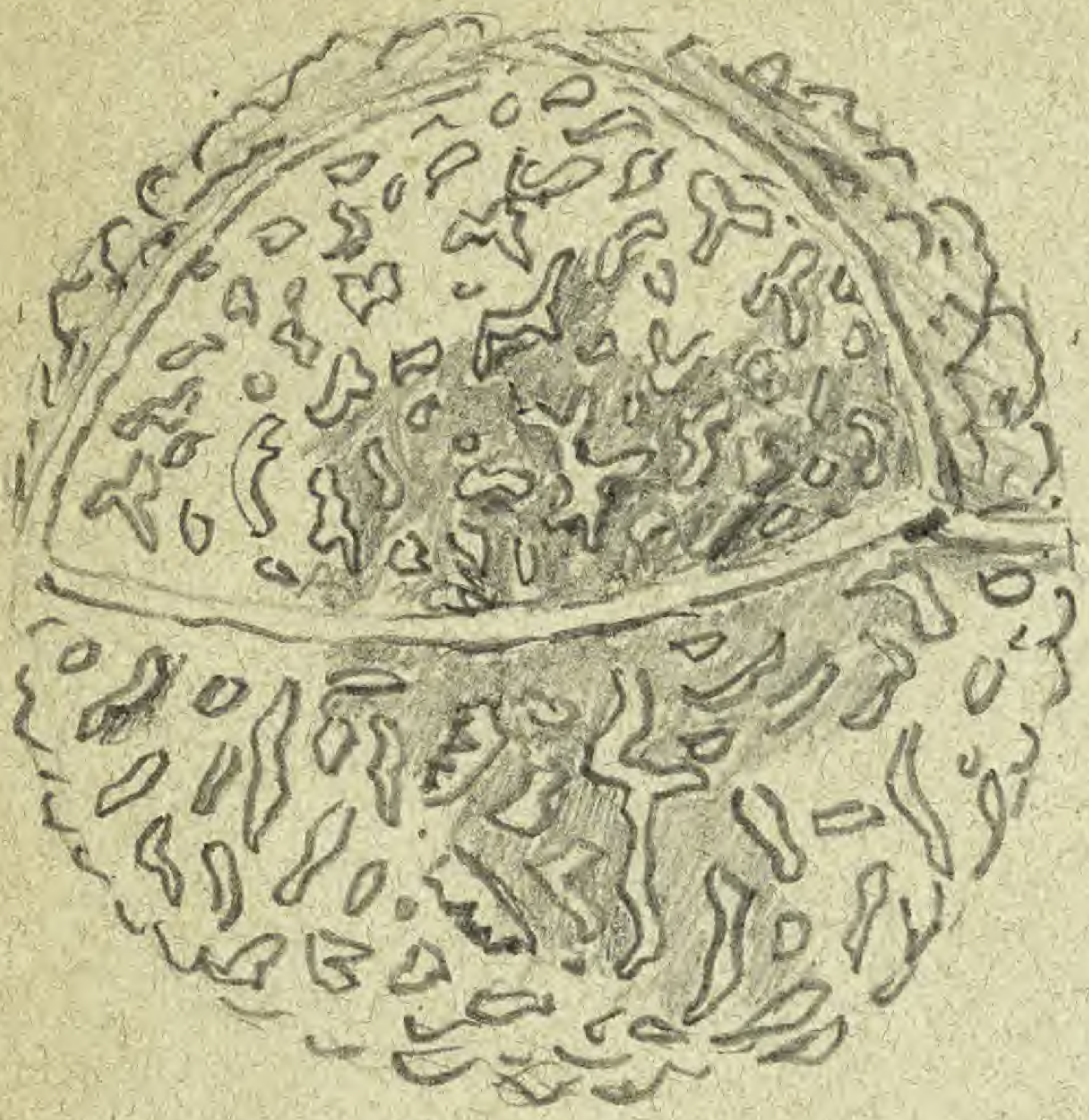
Isoetes

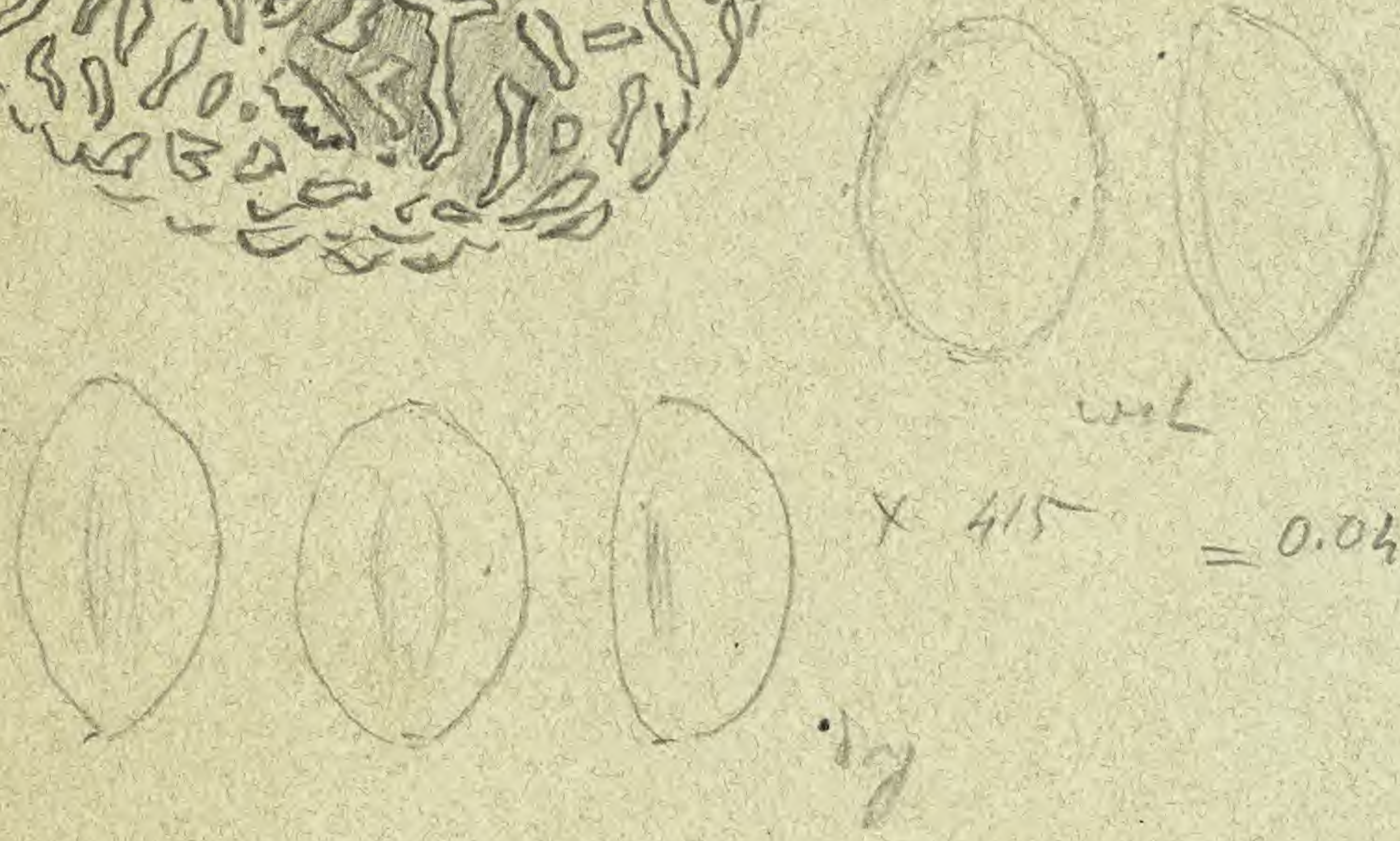
25 Nov 1863

Echo Lake N.H. Sept 17 1856

G E

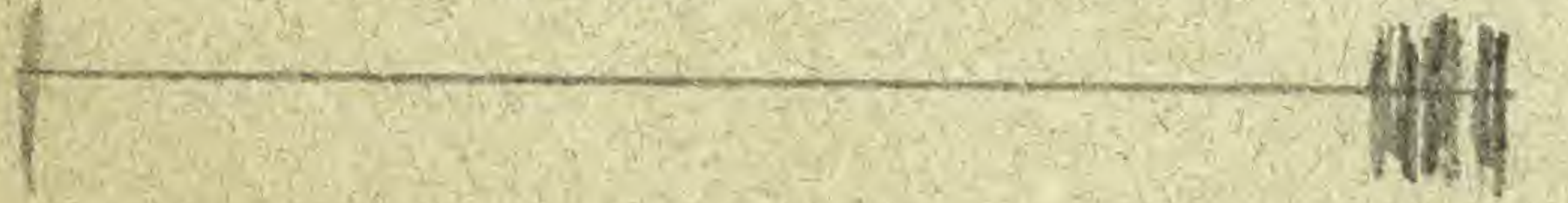
x60





x 415 = 0.041 - 0.043

x 60



21-23 lin = 43 - 47.5 mm

= 0,35 - 0.38 lin

= 0.72 - 0.79 mm

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13584

ALL
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CHEMIST.
AL

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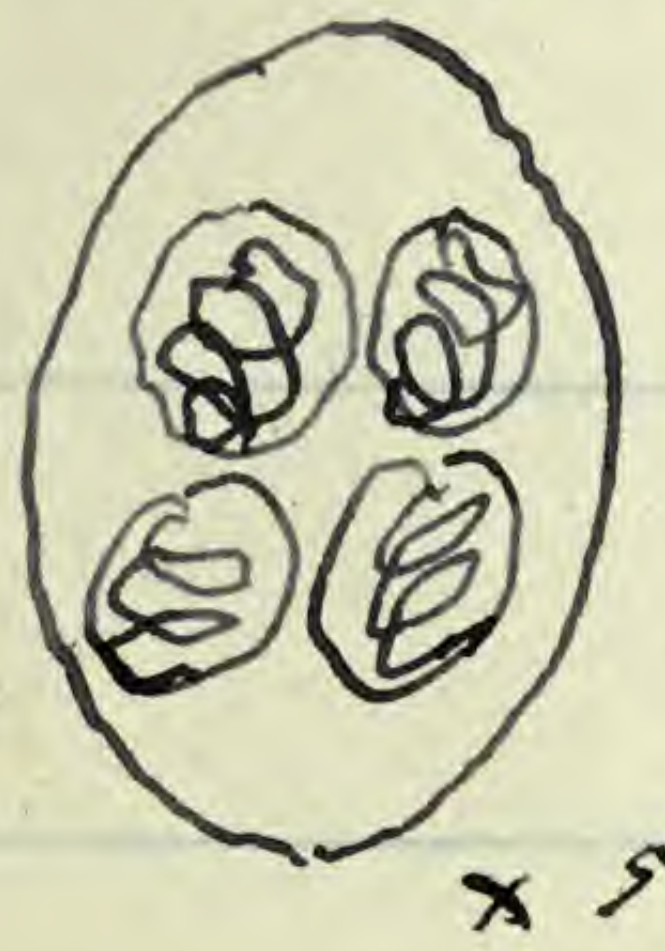
Cambridge Oct 7 1883

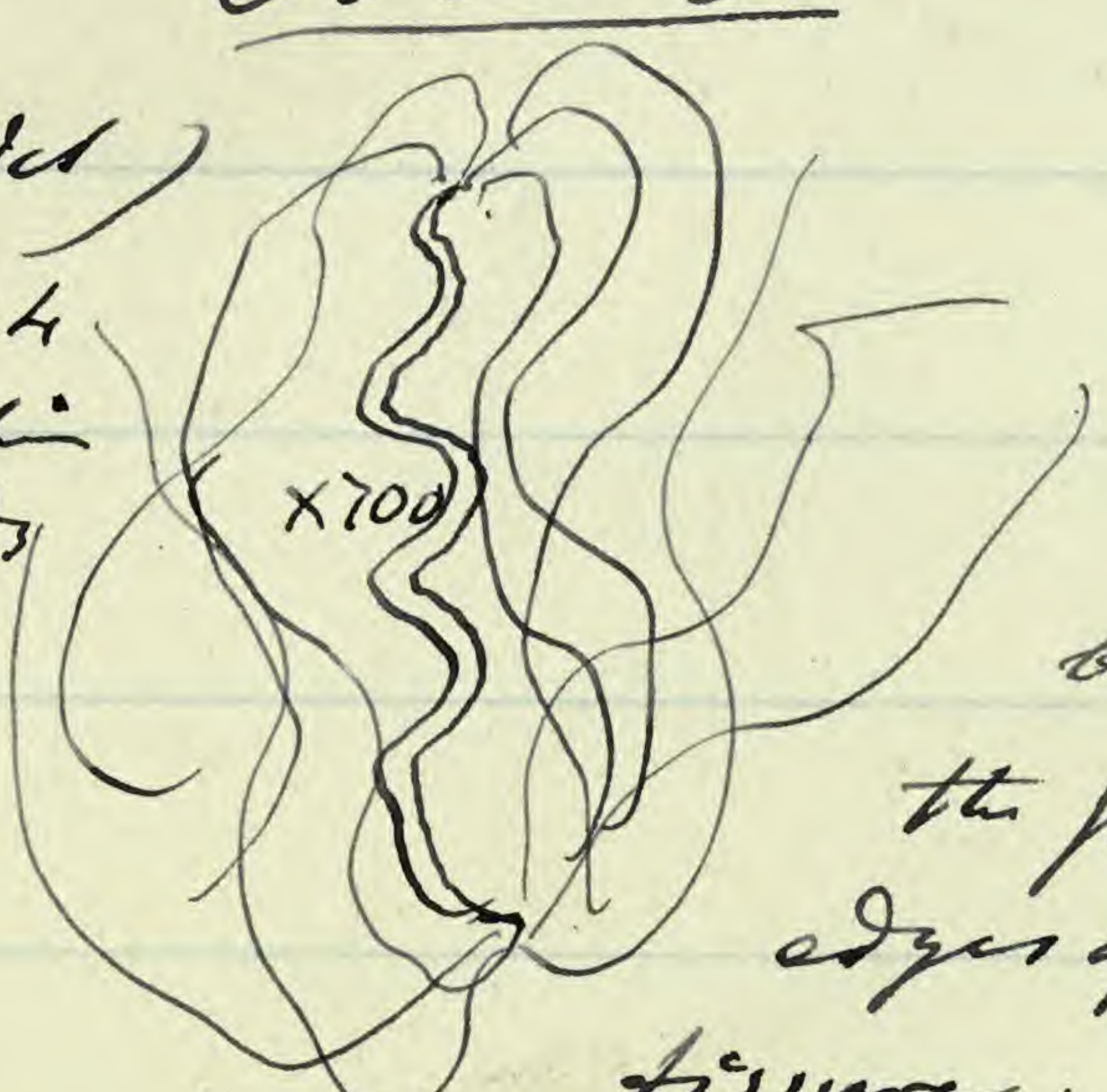
Sachs Botany

Isoetes

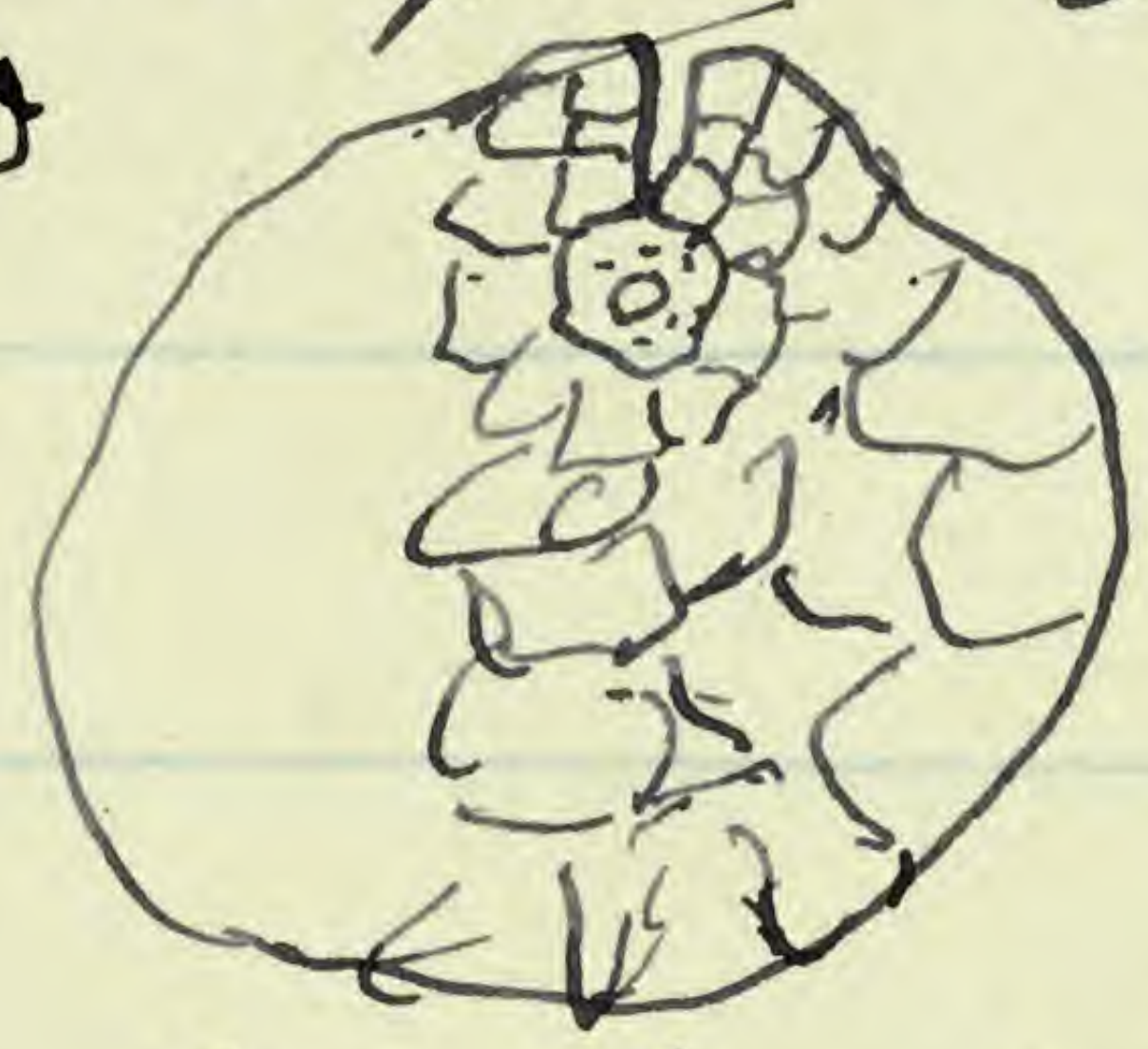
Microspores (. Millardet)



frontal view with 4 cells which contain 4 antherozoids



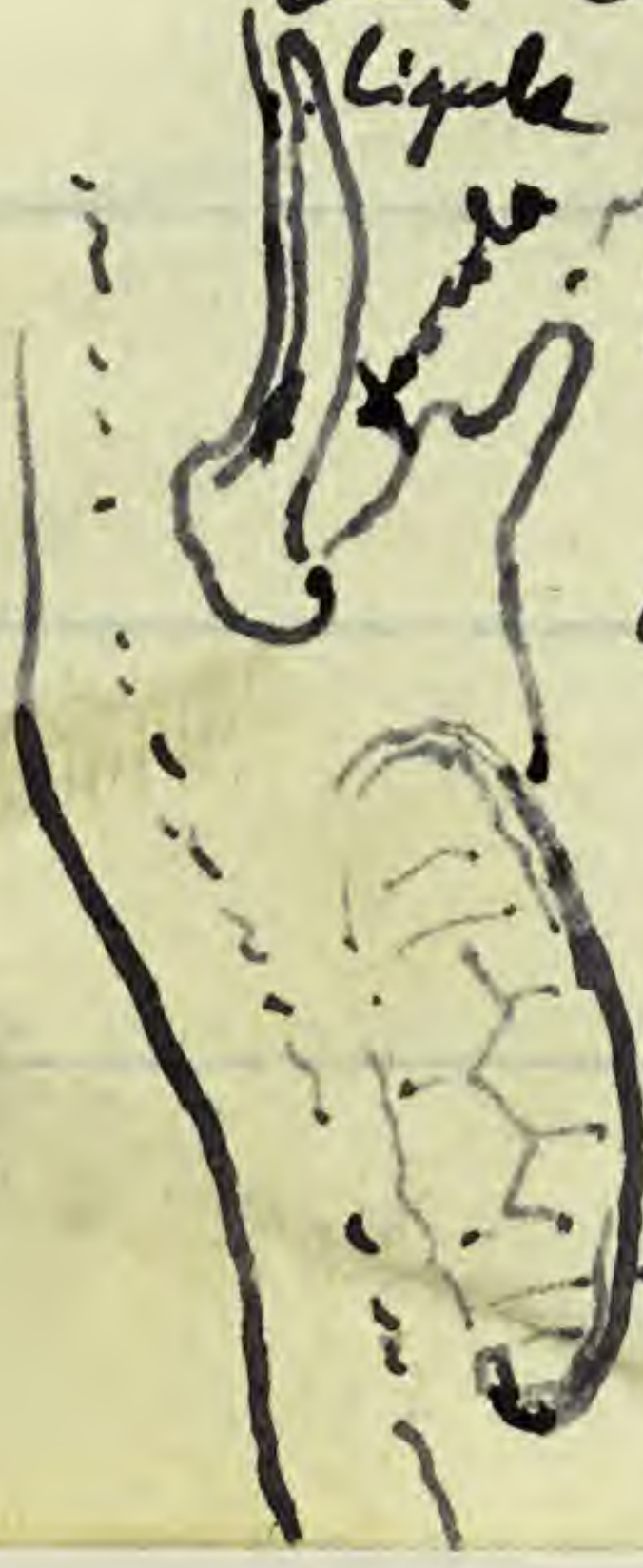
The cavity of the macrospores begins to fill with cellular tissue a few weeks after the escape of the macrospores from the decaying macrosporangium; the endospore thickens, becomes differentiated into two layers; the prothallium now swells up, the 3 convergent edges of the ~~spore case~~ exospore burst in a 3 rayed fissure, then the membranaceous endospore also peels off and the protruding part of the prothallium is exposed. On its top is the archegonium formed



If one Archegonium is not fertilized, others are formed in centrifugal succession on the free part of the prothallium.

Stem short, above funnelshaped, no internodes; the increase in thickness of the stem, the long continuance of which distinguishes it from that of all other Cryptogams, is brought about by a layer of meristem inside, surrounding the central vascular body and continually producing new layers of parenchyma on the outside --- slowly dying off on the outside; roots from the grooves in acropetal succession.

In Isoetes and Selaginella are the only dichotomous roots known



Vertical section through unripe microsporange of Isoetes Lacustris

Ligula
Labium and between them foveola

13585

30

lacustris

vera Europaea

macrospores

Gay 0.56 – 0.65
Hennigsdorf 0.47 – 0.58

microspores

Gay 0.039 – 0.041
Hennigsdorf 0.039 – 0.040

Fenestrules mostly broad oval, sometimes irregular and arched where most expanded towards the border: 8 in longitudinal and 8 or 9 in transverse lines in a space of two lines, indicating nearly equal dimensions in the fenustrular spaces.

Chalices or *cells* large, irregularly placed near each other upon the two sides of a fine line or keel, usually two, sometimes one, and sometimes three to each fenestrule.

Reverse unknown.

Geol. Pos. & Loc.—This beautiful and delicate species was found on the same slab with the *F. nodosa*, and belongs to the Hamilton Group.

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Polyzoum or *Bryozoum*, a fan-like expansion, with large longitudinal rays and oscules distinctly visible to the naked eye.

Longitudinal rays large, basaltiform, with a middle keel and two rows of chalices; bifurcating seldom towards the base, but frequently and mostly in opposite series towards the middle; four to five in each series.

13586

diating from a central axis.

Longitudinal rays small, sharply defined; straight, rigid and wire-like upon the reverse; seldom branched, sometimes anastomosing; mostly branching from dissepiments, by which the fenestrules are much diminished in size.

Dissepiments, on the reverse, small and sharply defined; mostly opposite, in straight or curved lines; sometimes alternate.

Fenestrules large, longer than broad, mostly quadrangular, sometimes rounded at angles and more or less irregular in size. On the medallion face the fenestrules are crowded by the growth of the cells, and are more or less oblong oval.

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Bryozoum a broad, funnel-shaped expansion, with longitudinal rays frequently branching and rapidly diverging so as to give an explanate or flat form to the funnel, which only shows the reverse or lower surface.

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31-7

lacustris

var macrospora

Macrospores	~~0.75~~
Lake Super	0.69 - 80
Echo Lake E.	0.72 - 79
Bethlehem?	0.67 - 74
Catskill	0.72 - 81
Brattleboro	0.53 - 63
Uxbridge	59 - 71
Echolake Tuk	50 - 66
Fresh pond	55 - 67

Microspores	~~0.40~~
Lake Super	0.039 - 0.043
Echo Lake	0.041 - 0.043
Bethlehem?	0.035 - 0.038
Catskill	0.034 - 0.036
Brattleboro	0.034 - 0.037
Fresh pond	39 - 48
Uxbridge	45 - 48

13587

Fenestrules mostly broad oval, sometimes irregular and arched where most expanded towards the border: 8 in longitudinal and 8 or 9 in transverse lines in a space of two lines, indicating nearly equal dimensions in the fenustrular spaces.

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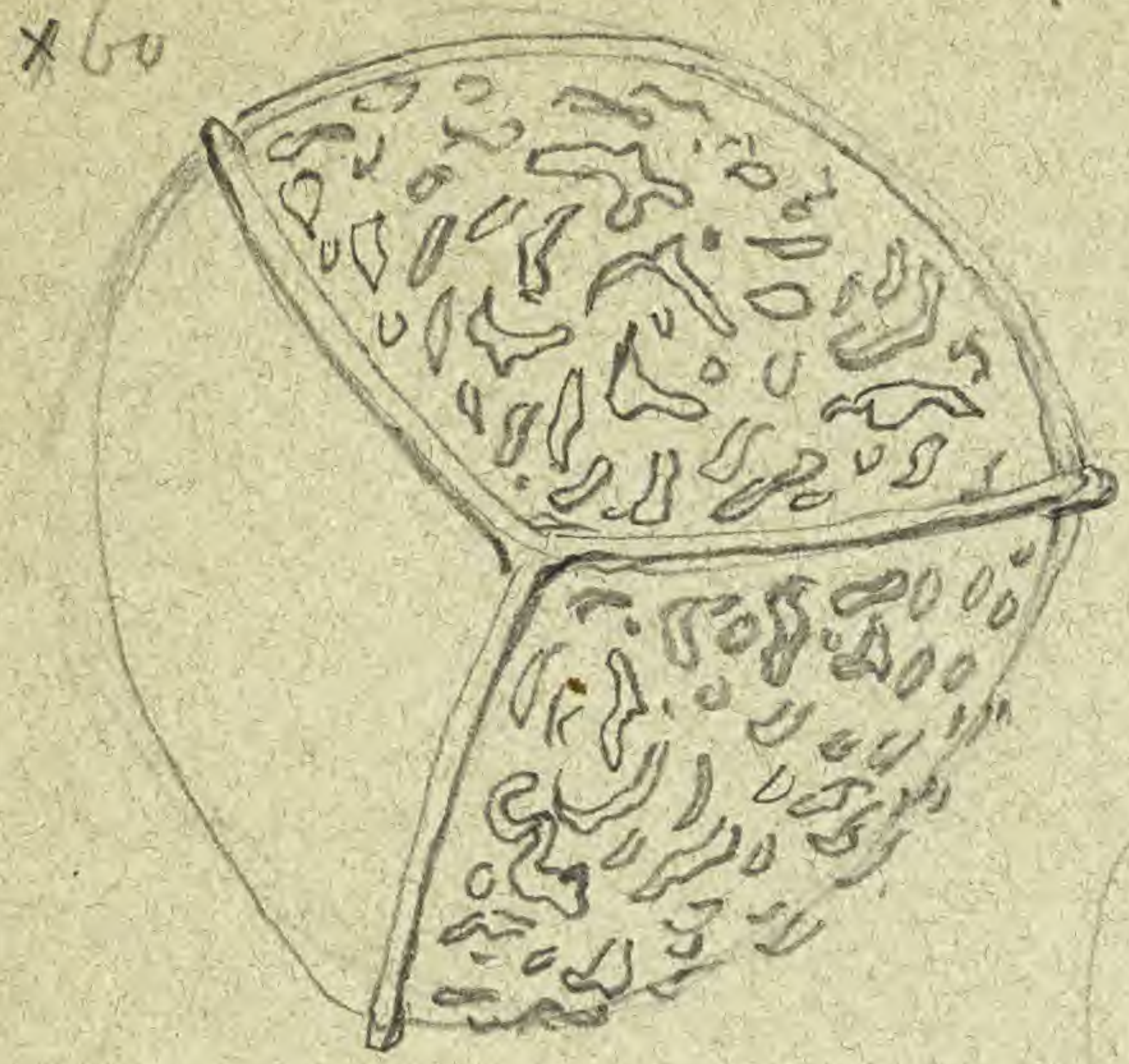
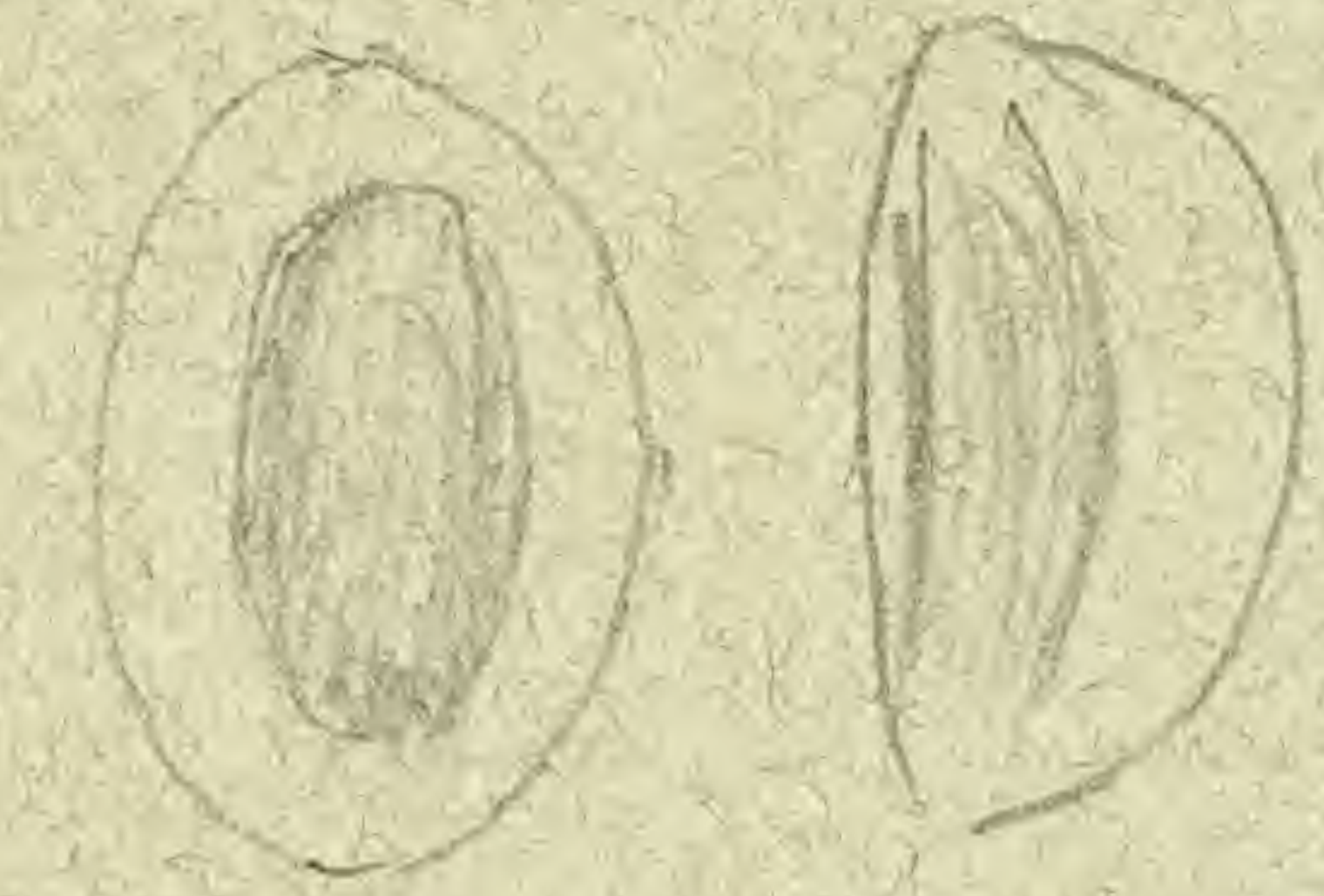
Isoetes lacustris   Nov 25 1863

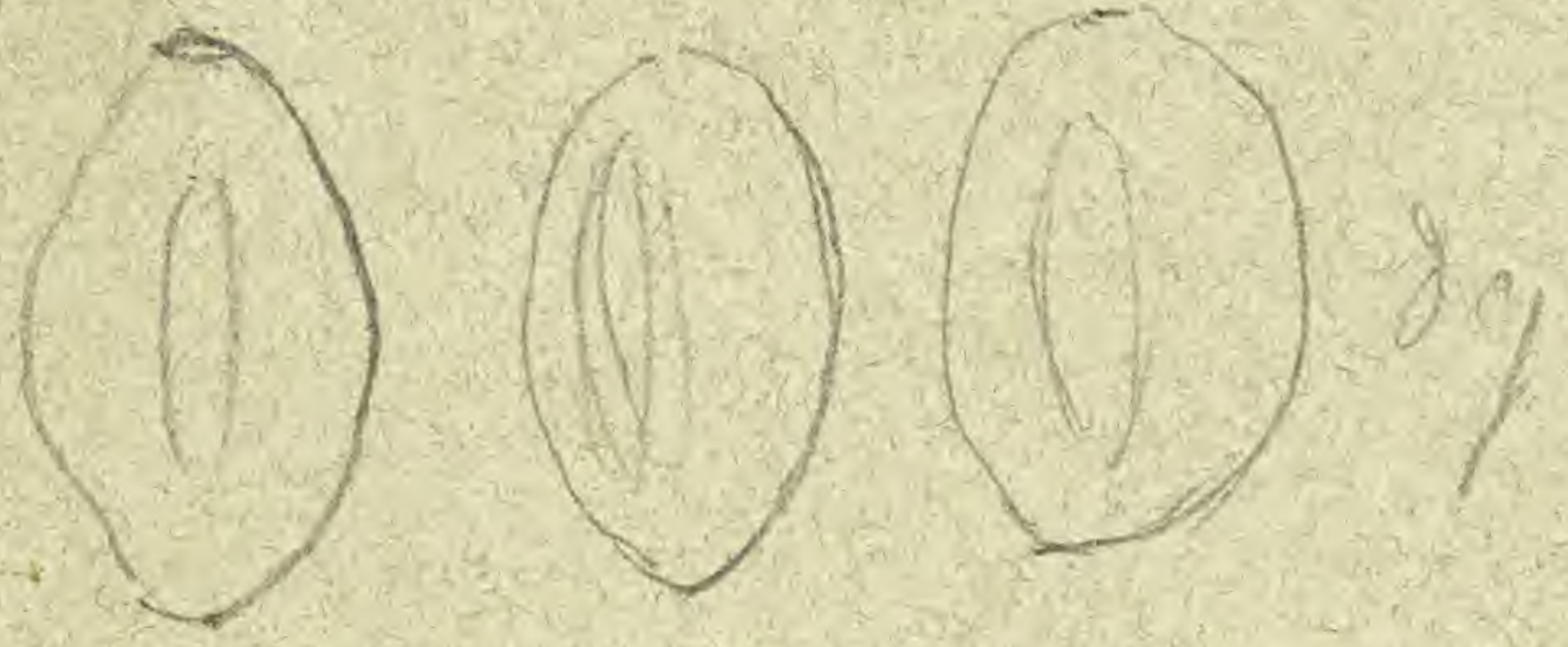
Lac Chauvets   Gay 1861   27 Aug



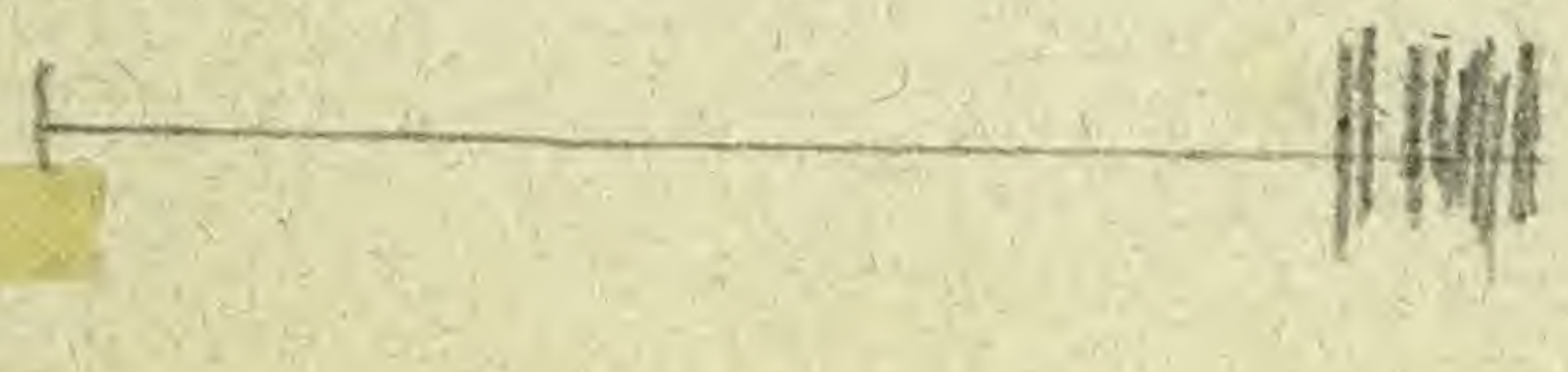


x415

0.039-0.041



s.p. of spores x60



$\frac{16-18.5 \text{ lin}}{60} = 0.27-0.31$ lin

$\frac{33.5-39 \text{ mm}}{60} = 0.56-0.65$ mm

13588

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CHEMIST.
A.L.

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Isoetes lacustris (fide Braun
who has seen the specimens)

Echo Lake, Franconia Mountains
about 1844 – E. Tuckerman
in litt. 27 Nov 1866.

"This is the only locality in the whole Mountains where I ever, or, so far as I know, any one else ever observed the genus."

A specimen in Herb A Gray sent by Tuckerman and marked:
"White Mountains, in lacubus minime rara 1843" is the same as my plant, collected 13 years later.

G.E

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13589

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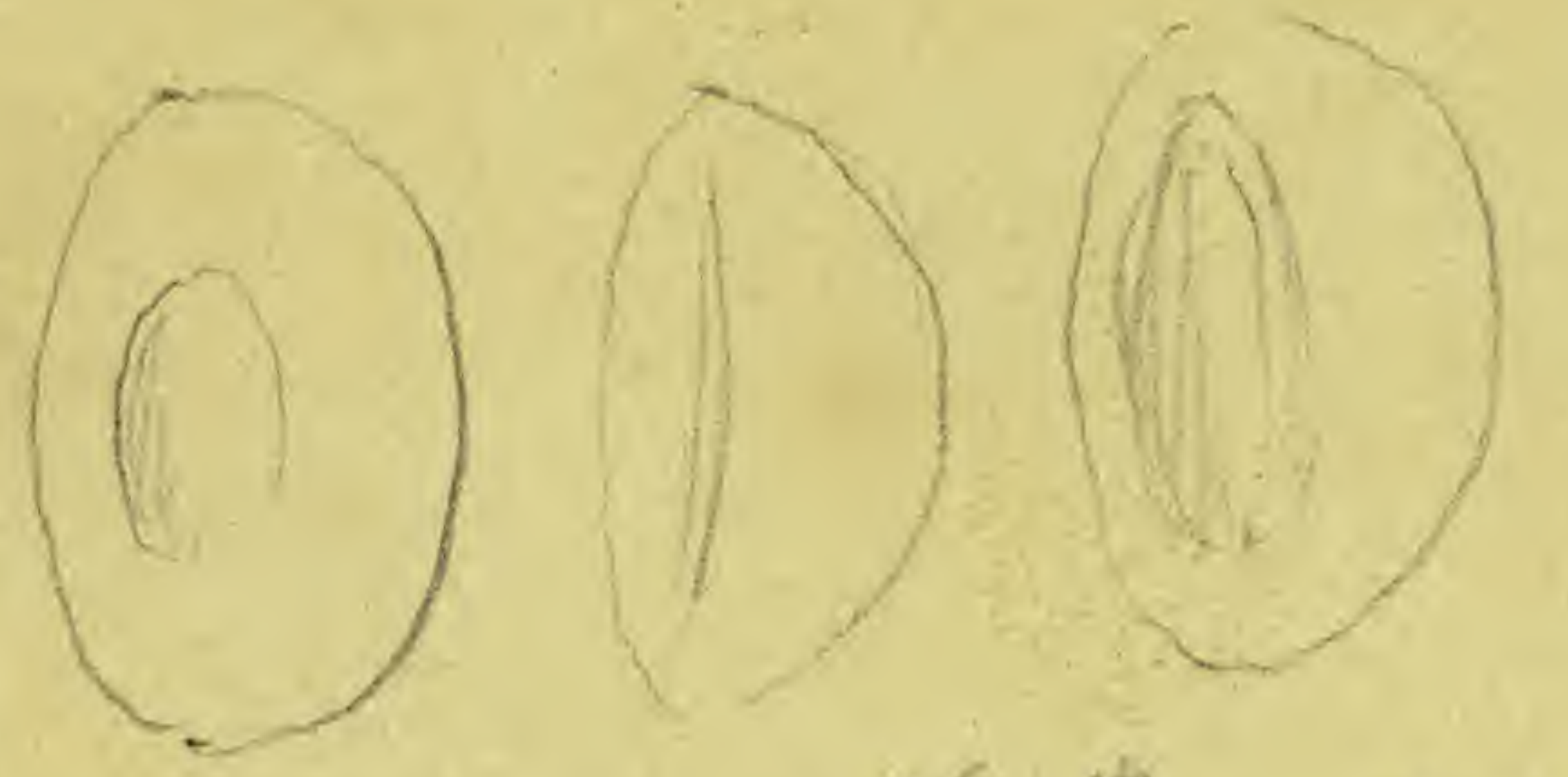
Isoetes lacustris

fide Durieu

Octob 1 1866

Sault de Ste Marie, Mich^n, Porter 1865 - Jul 27



$\frac{16-18}{415} = 0.039 - 0.043$ mm.

about 0.04 mm

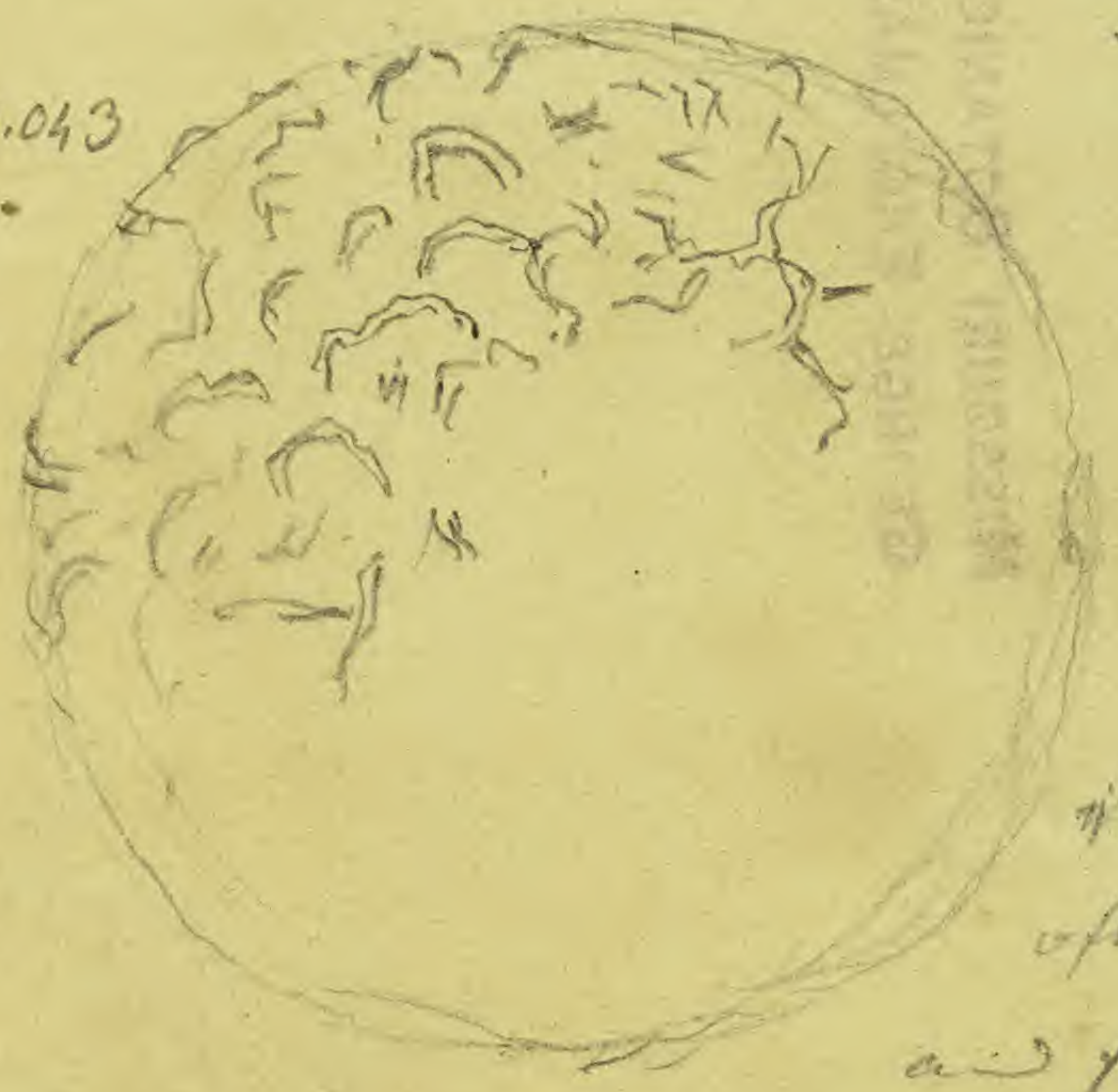
$\frac{41.5 - 48.5}{60}$?

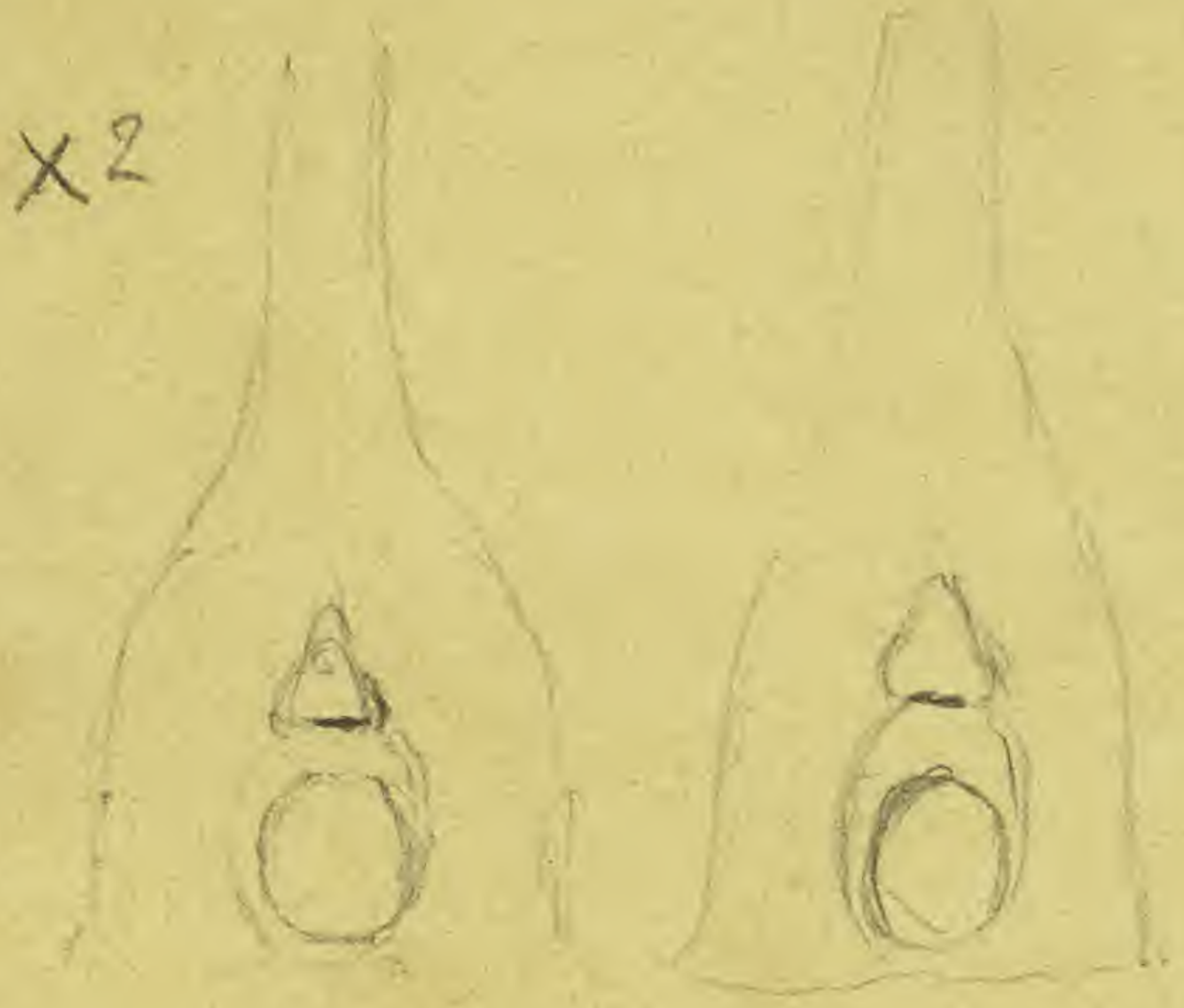
= 0,69 - 0,80 ?

$\frac{44}{60}$ = 0,73

largest fully developed spore

larger ones were smashed





irregular ridges often running together and forming meshes.

13590

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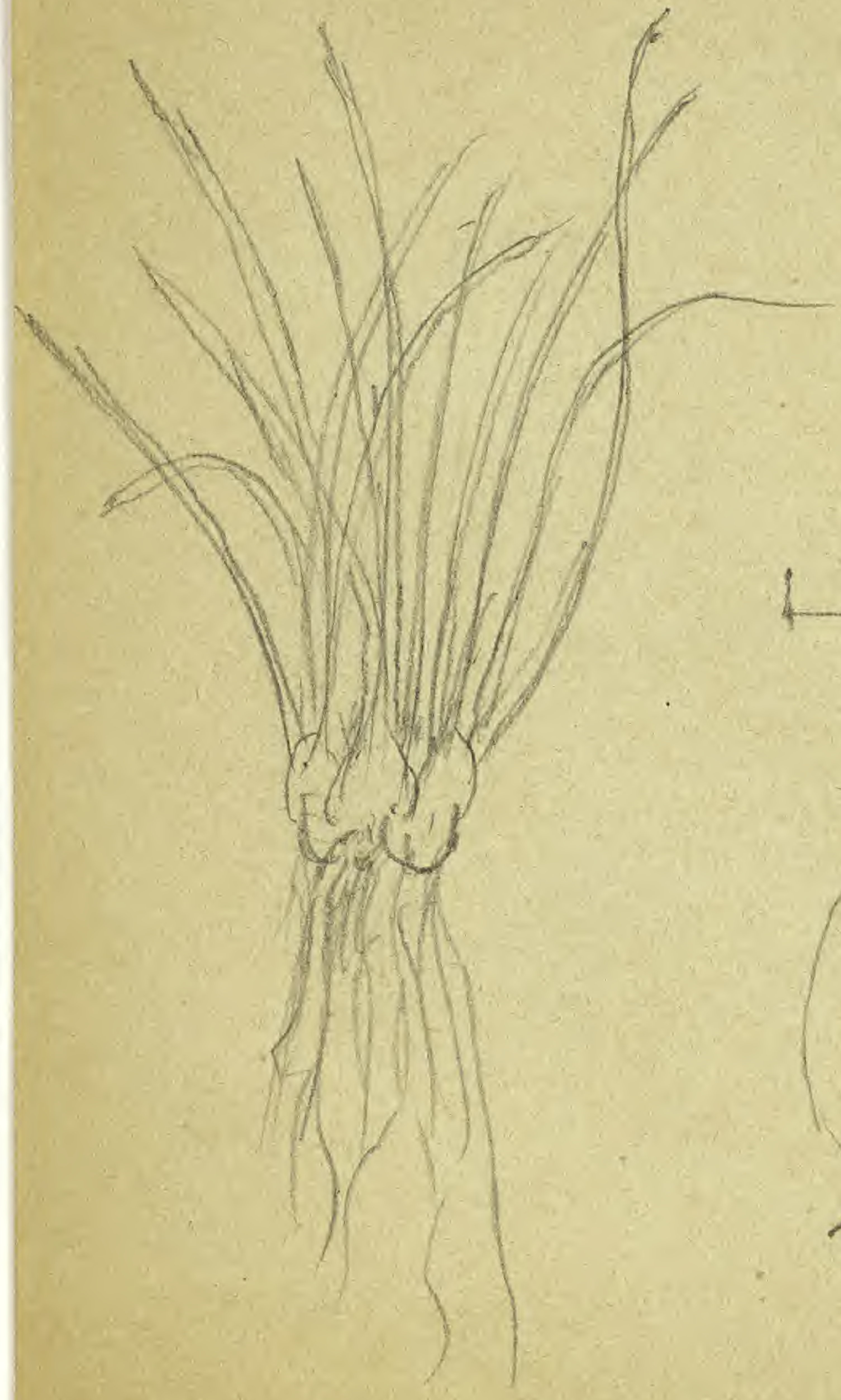
" Isoetes lacustris L "

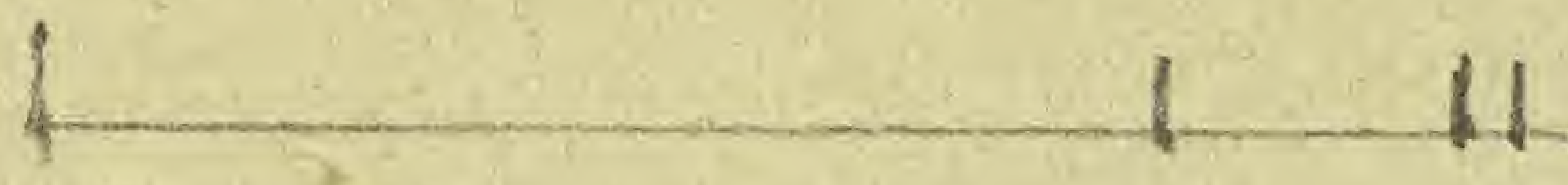
" White Mountains in lacubus minime
rara 1843 "

E. Tuckerman in Hb Gray
a single wormeaten specimen

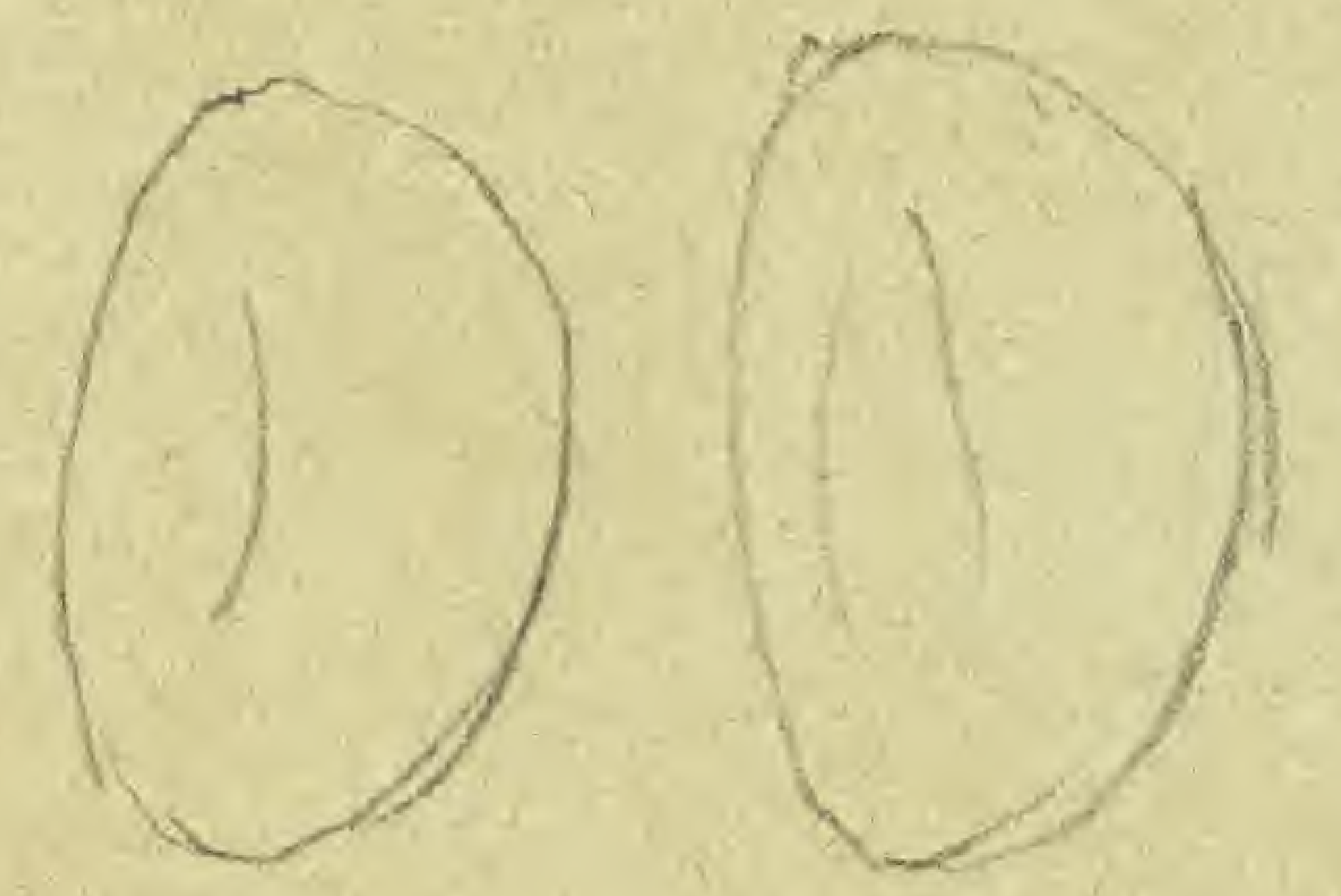
13 leaves, 2 inches
long.



spores incomplete



diam of Spores x60
= 0.50 – 0,66 mm



microspores

$\frac{18-19}{415}$ = 0.043 – 0.046 mm

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13591

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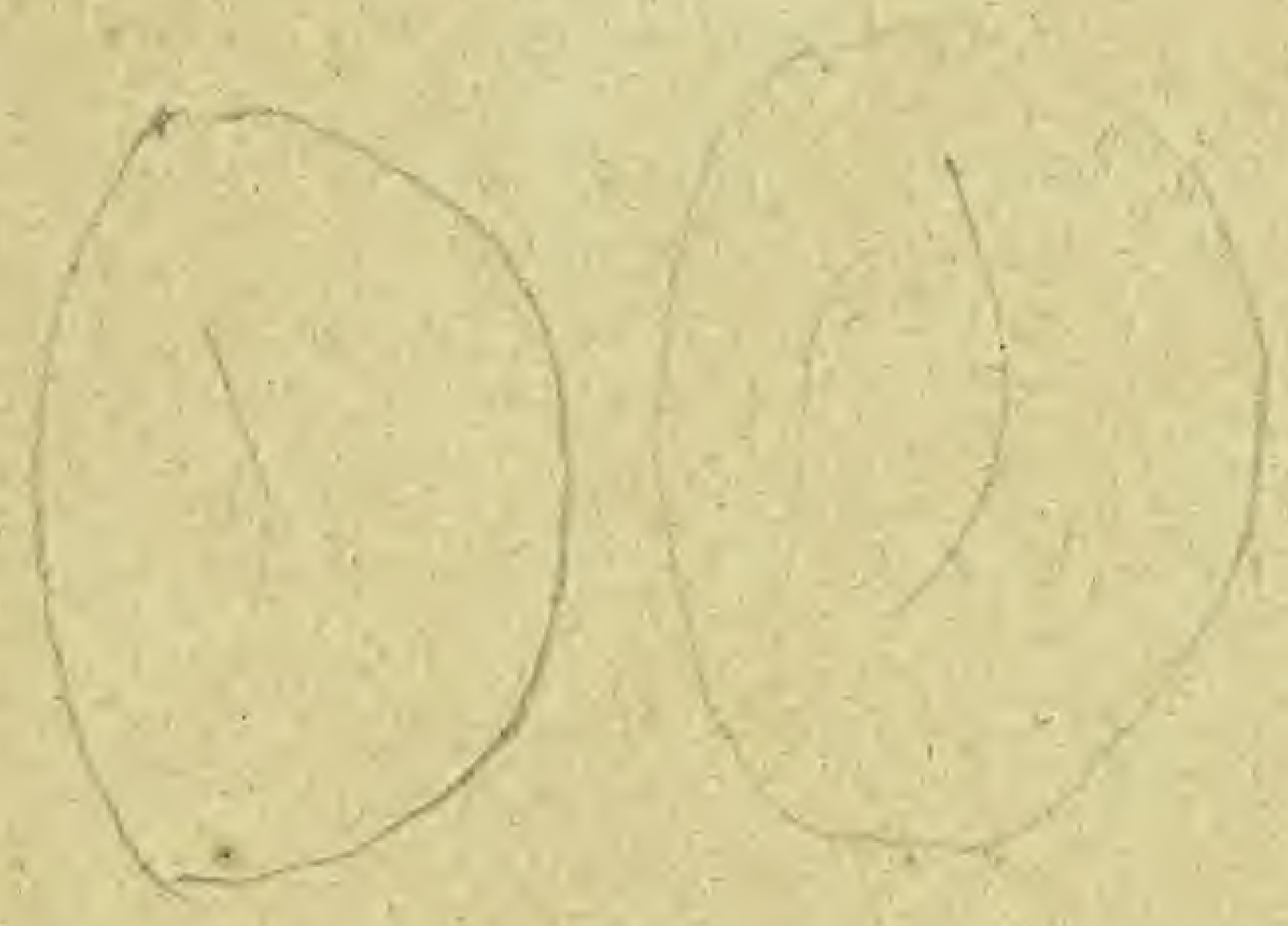
J.W. Robbins No 1 Isoetes lacustris Dec 28 1866

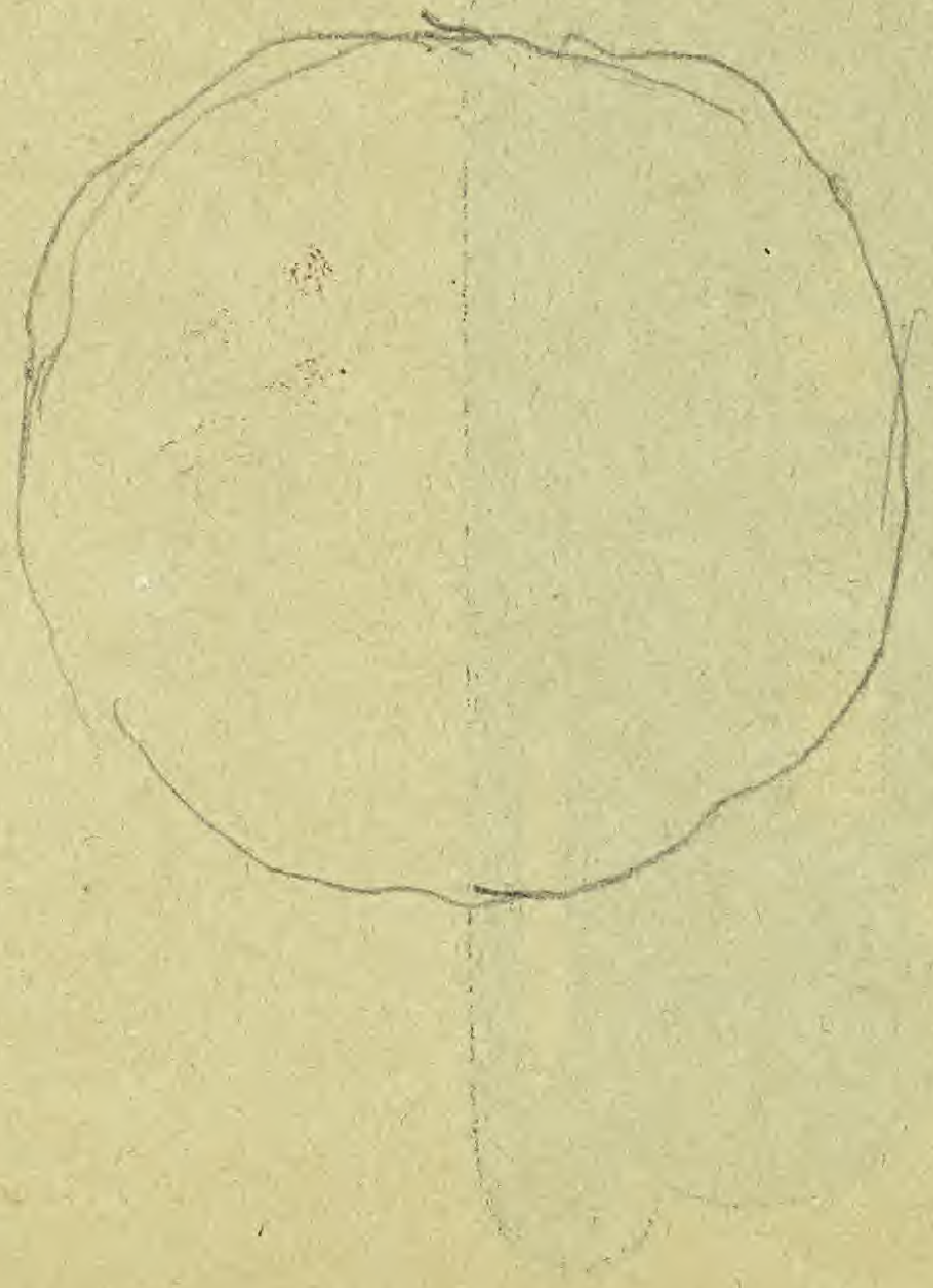
Uxbridge „many years since"
[1840–45.]

$\frac{36.2 - 42.6}{60} = 0.60 - 0.71$

sent to Braun, who confirms my decision



microspores 0.045 – 0.048 mm long



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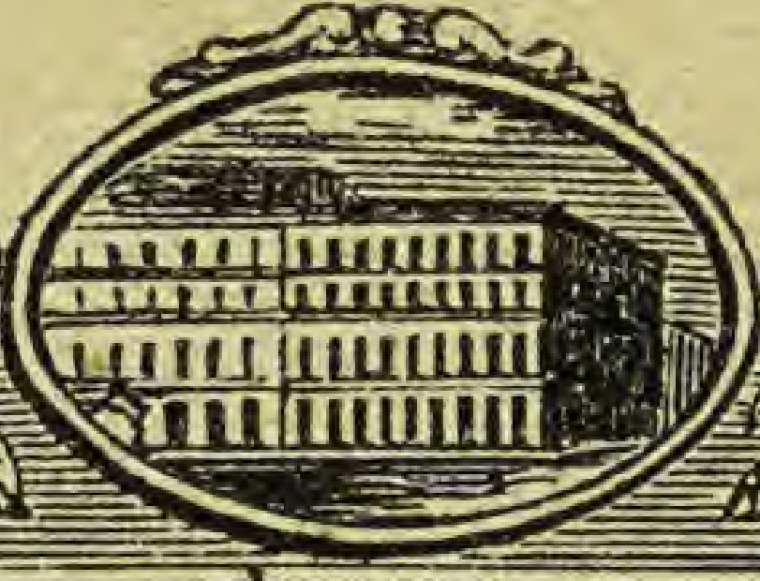
13592



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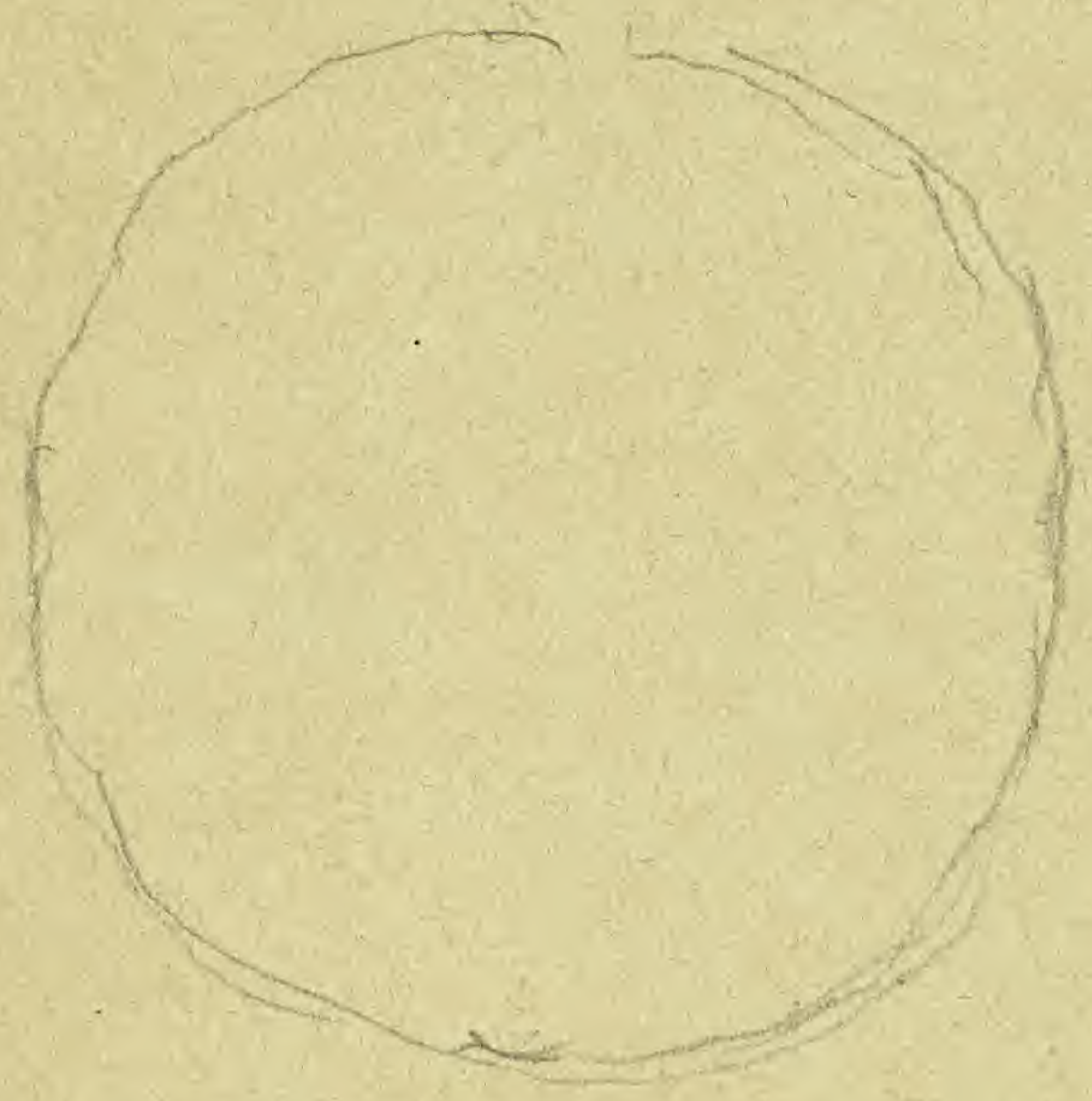
APOTHECARY & PHARMACEUTIST
COR. 4TH & OLIVE STS. ST. LOUIS

J. W. Robbins No. 3 Isoetes lacustris Dec 28 1866

Uxbridge, June 18 1845

$$\frac{35.6-42}{60} = 0{,}59-0{,}70 \text{ mm}$$



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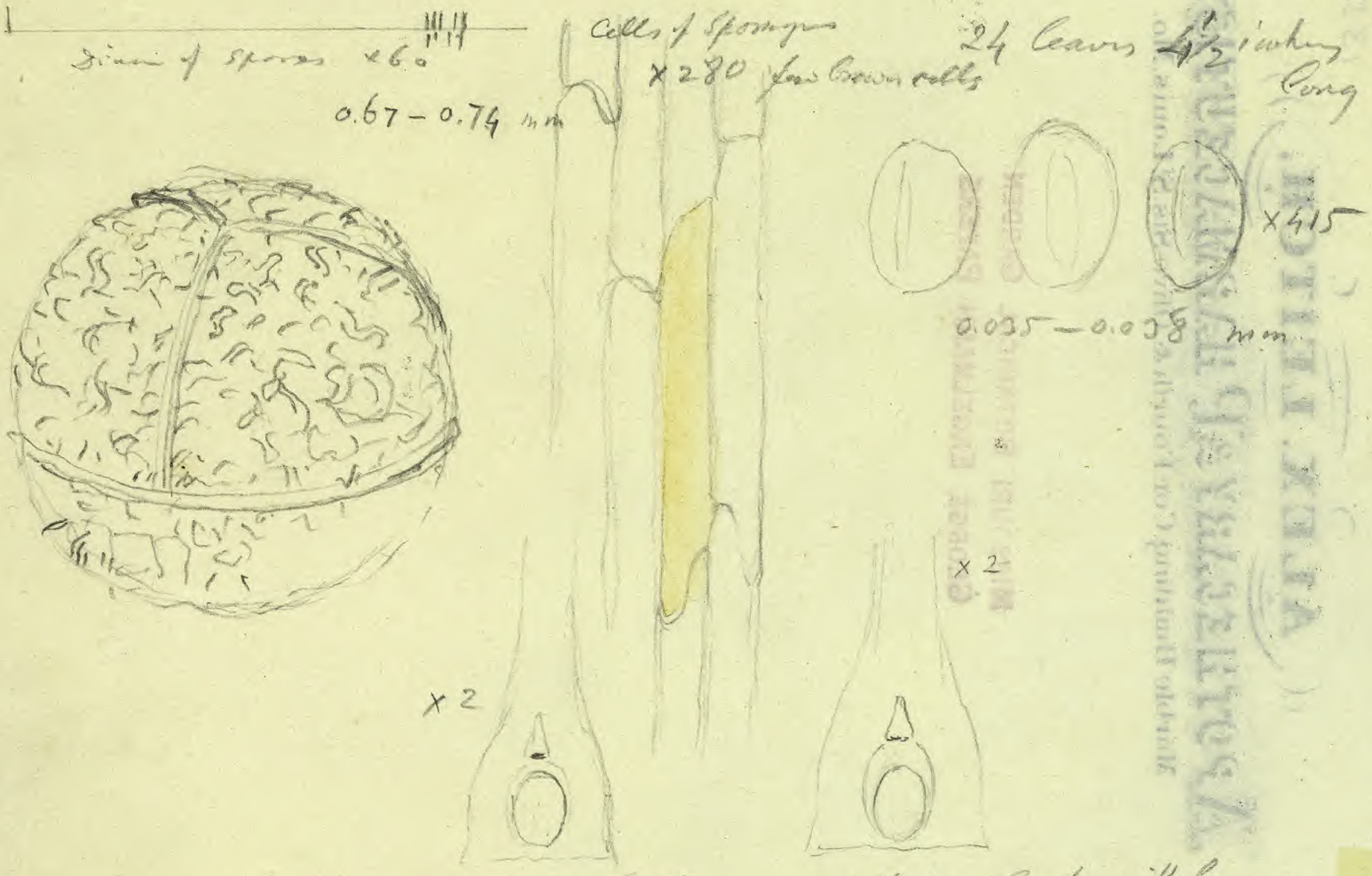
Isoetes

Octob 19 1866

Herbarium generale Acad Phil'ad. „Bethlehem"



24 leaves 4½ inches long

13594

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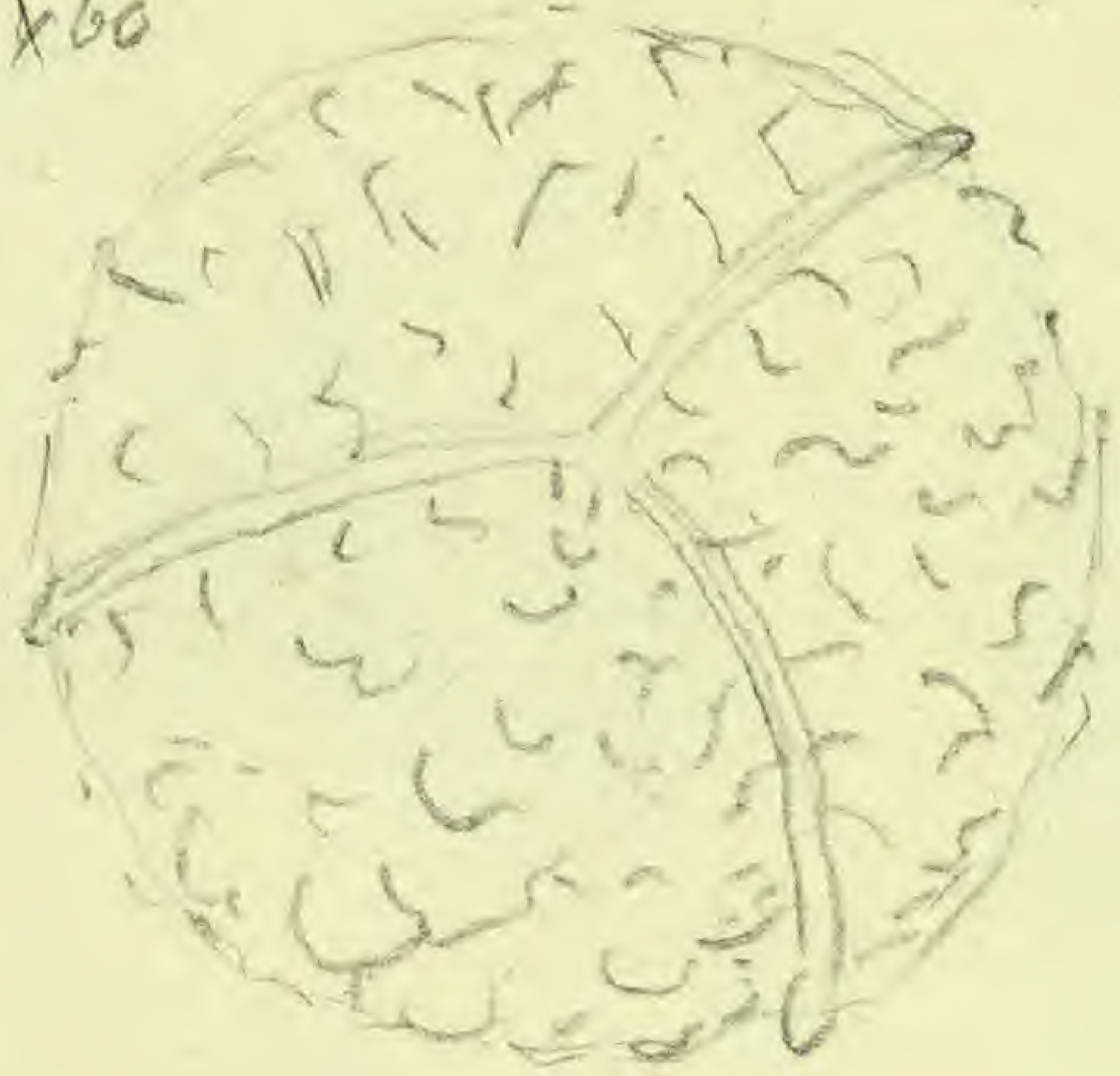
I. lacustris

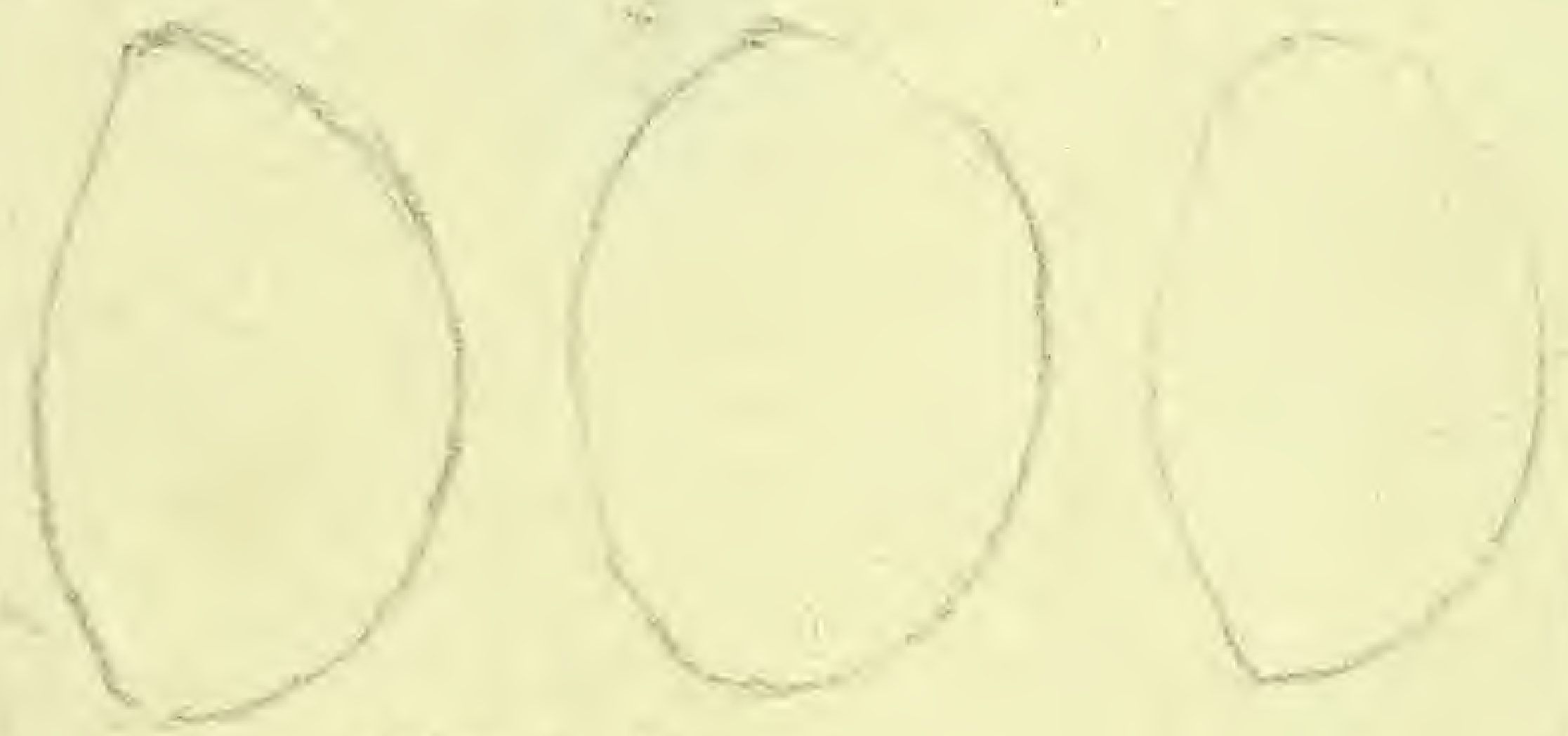
Oct 22 1866

Heringsdorf, Pommerania,
A Braun Sept 1864

$\frac{28-34.6}{60} = 0.47-0.58$ mm
diam of spores, not quite ripe

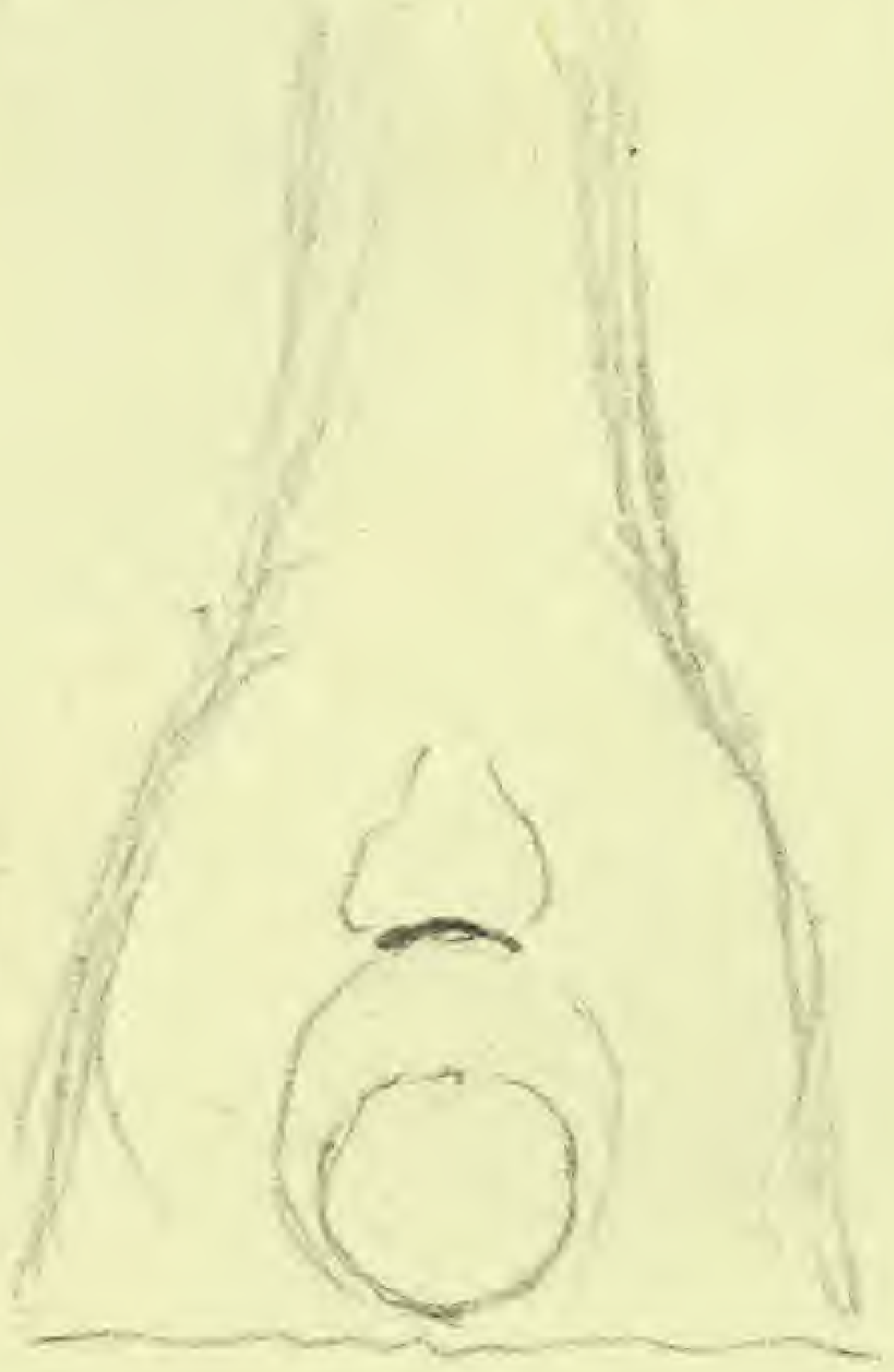
x60





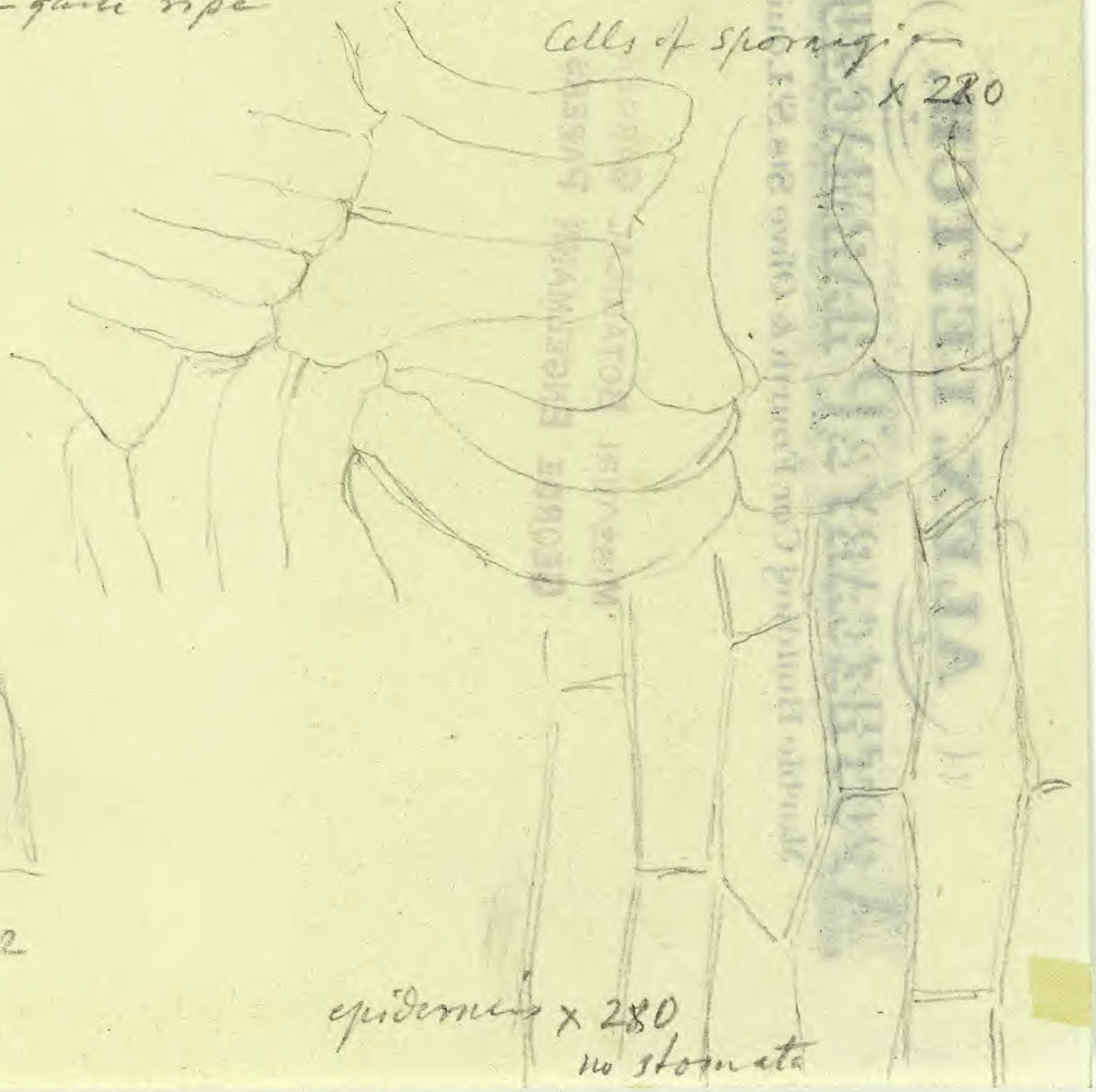
x415

= 0.039 - 0.048 mm



x 2

Cells of sporangium
x 280



epidermis x 280
no stomata

13595

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0 1 2 3 4 5 6 7 8 9 10
cm
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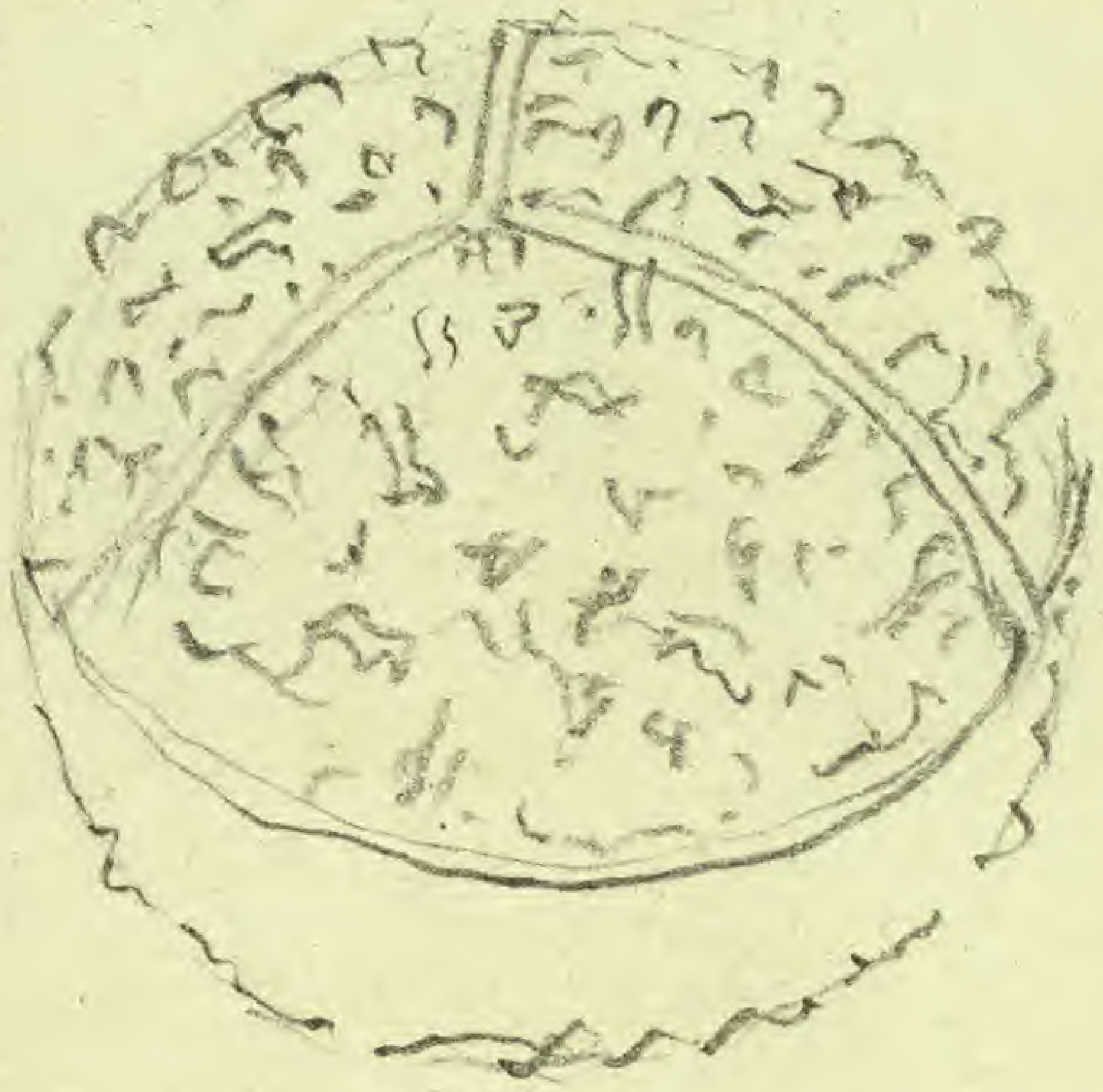
I. lacustris Dec 11 1866

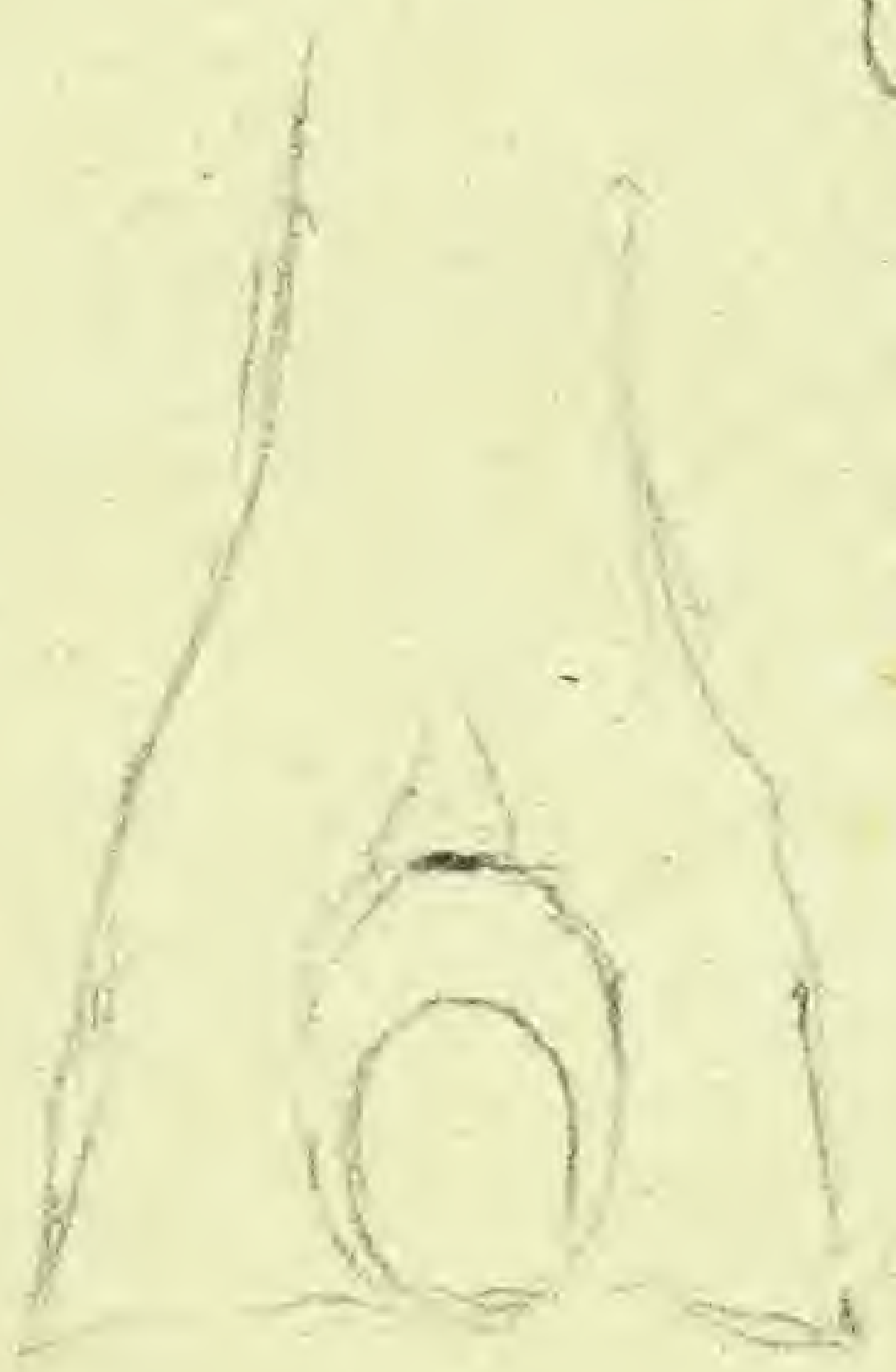
Island of the Lehigh near Bethlehem Durand
Sub nom I. riparia in Hb Gray
or is it riparia?

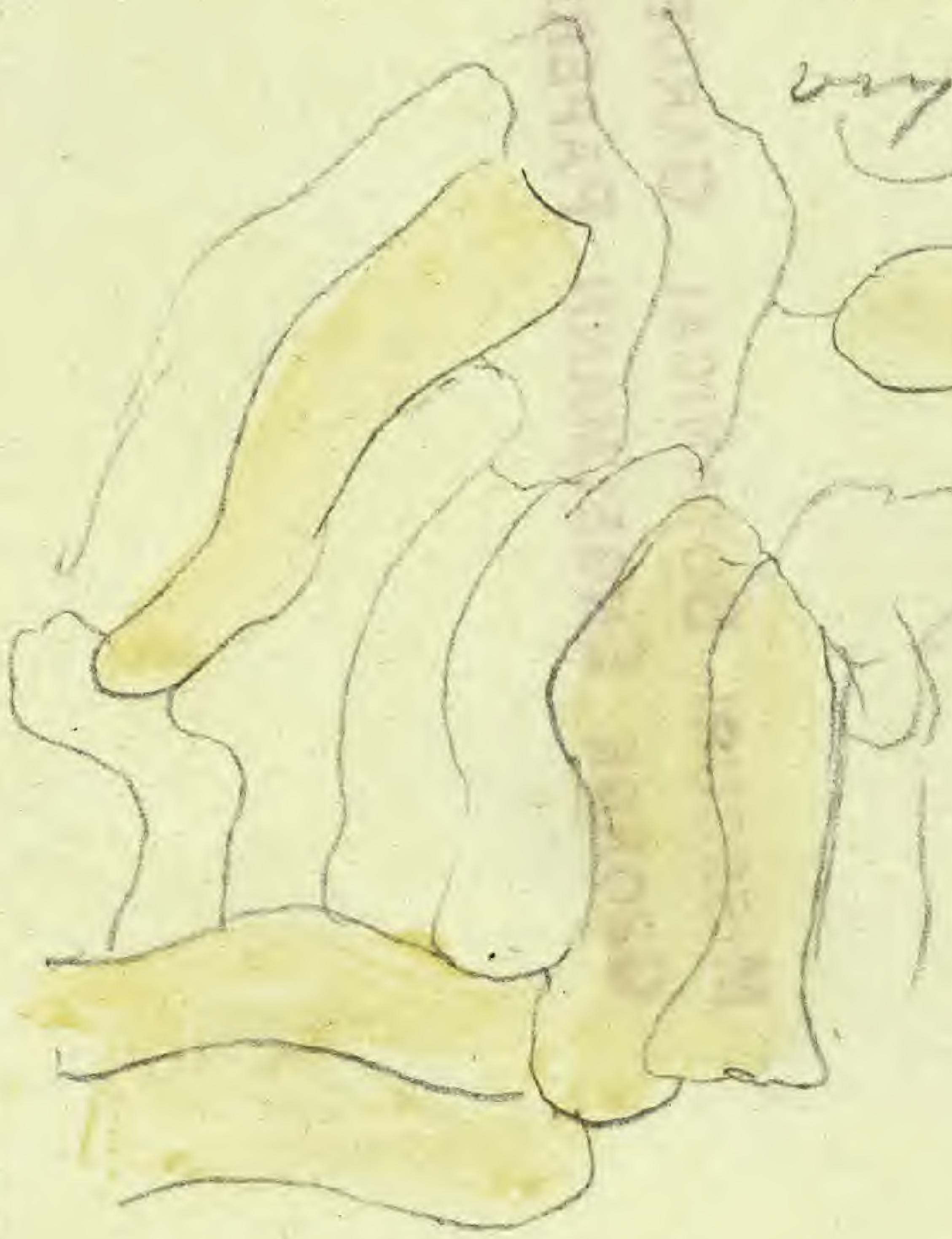
Diam of
Macrospores 30-37 mm
60

= 0,50 - 0.62 mm

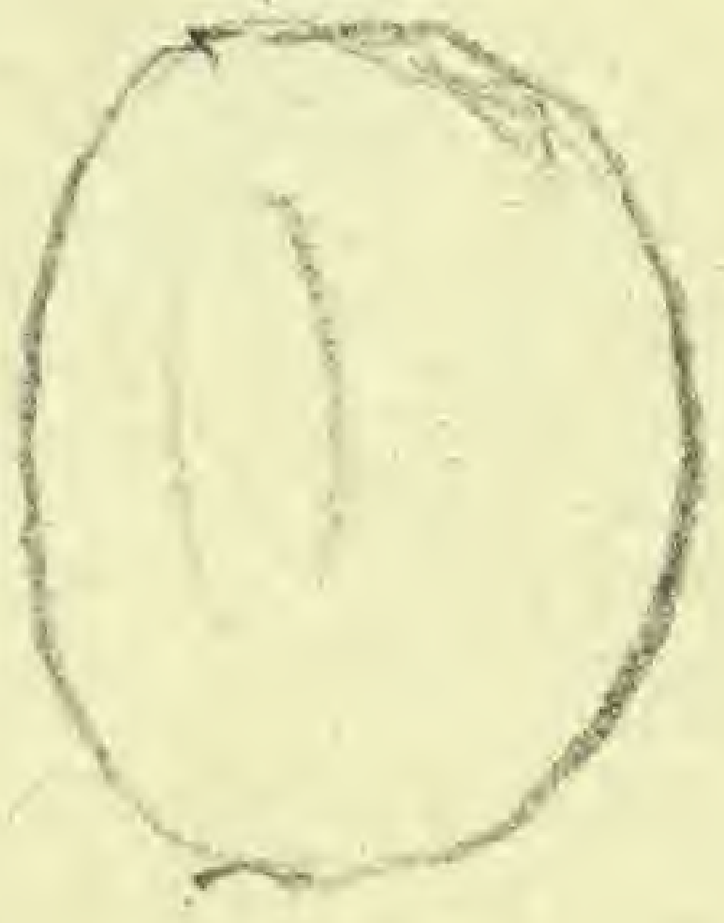
leaves 12-15
6-8 Centim. long
very slender







Sporangial cells ×280



no stomata seen

microspores 0.035-0.037 mm

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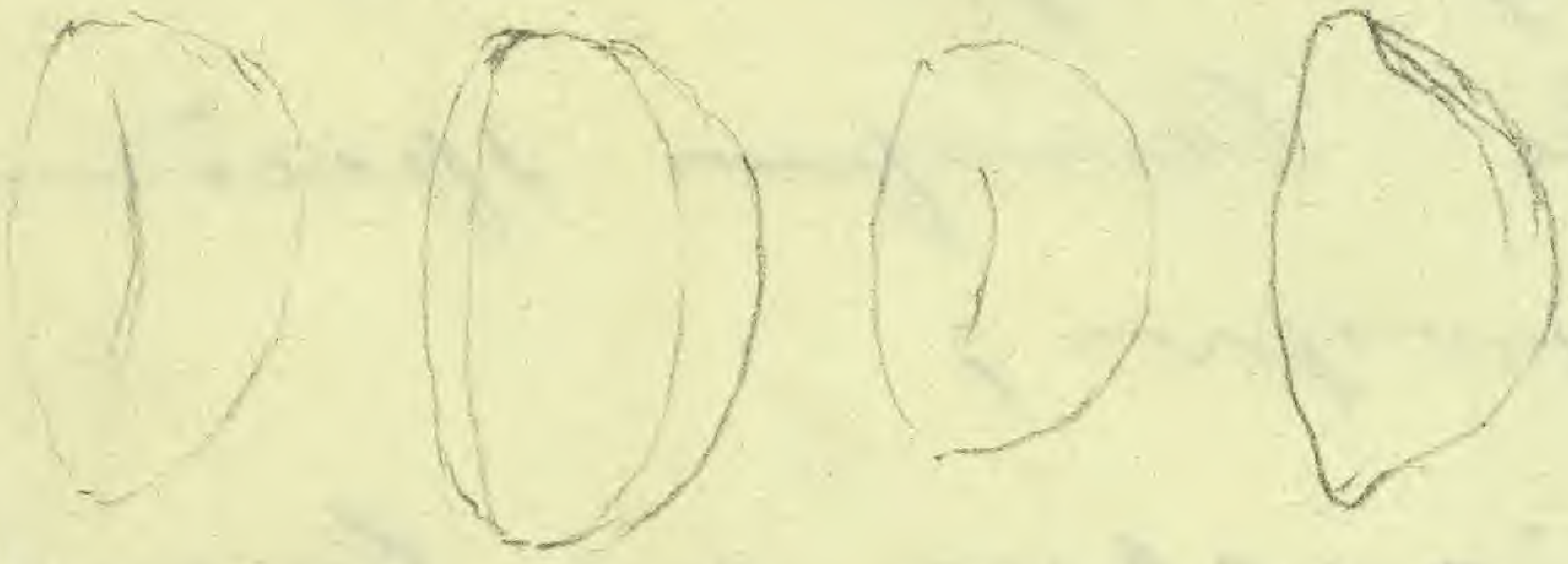
Isoetes lacustris Nov 22 1867

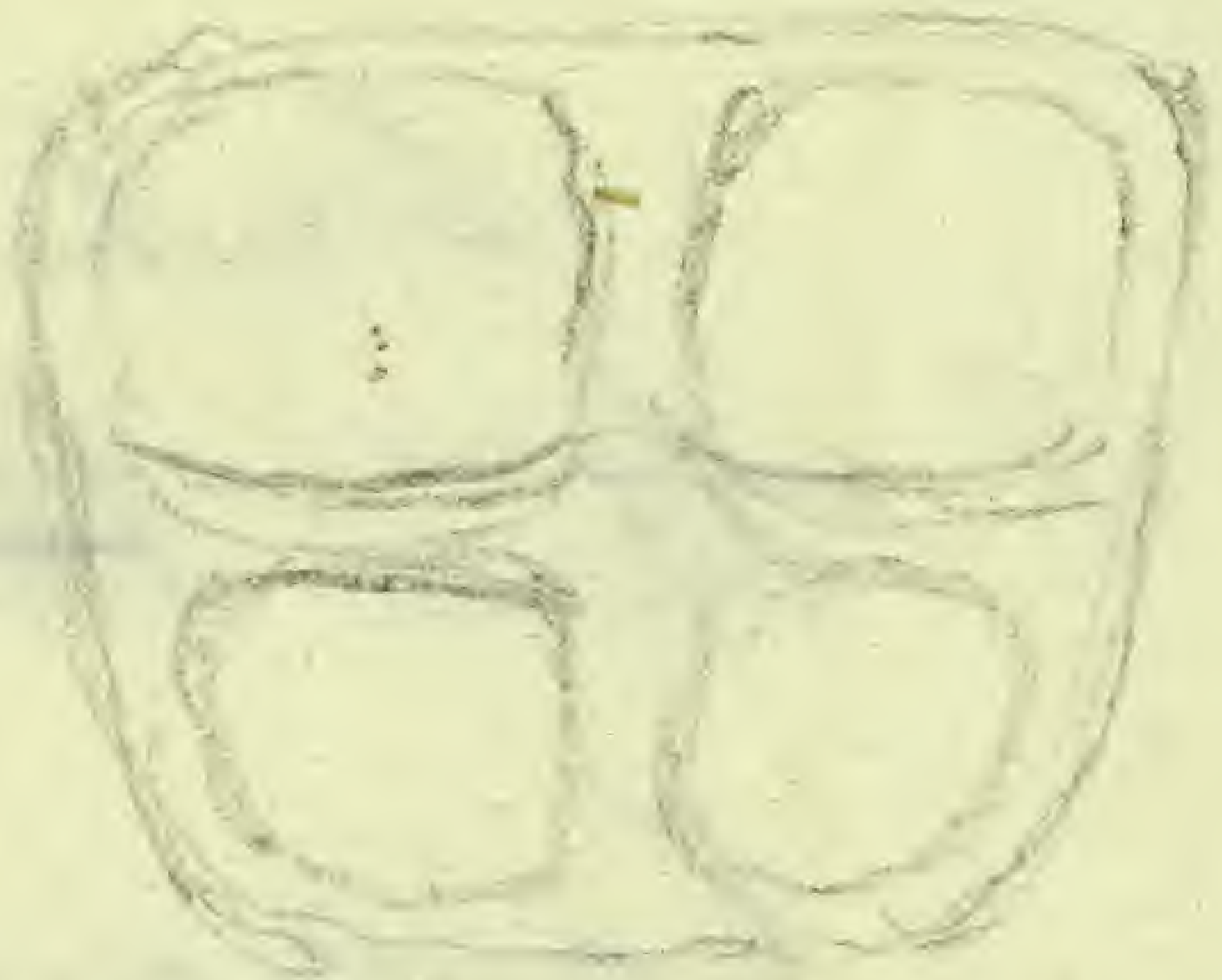
Wm Boott Fresh pond, north side Aug 20 1867

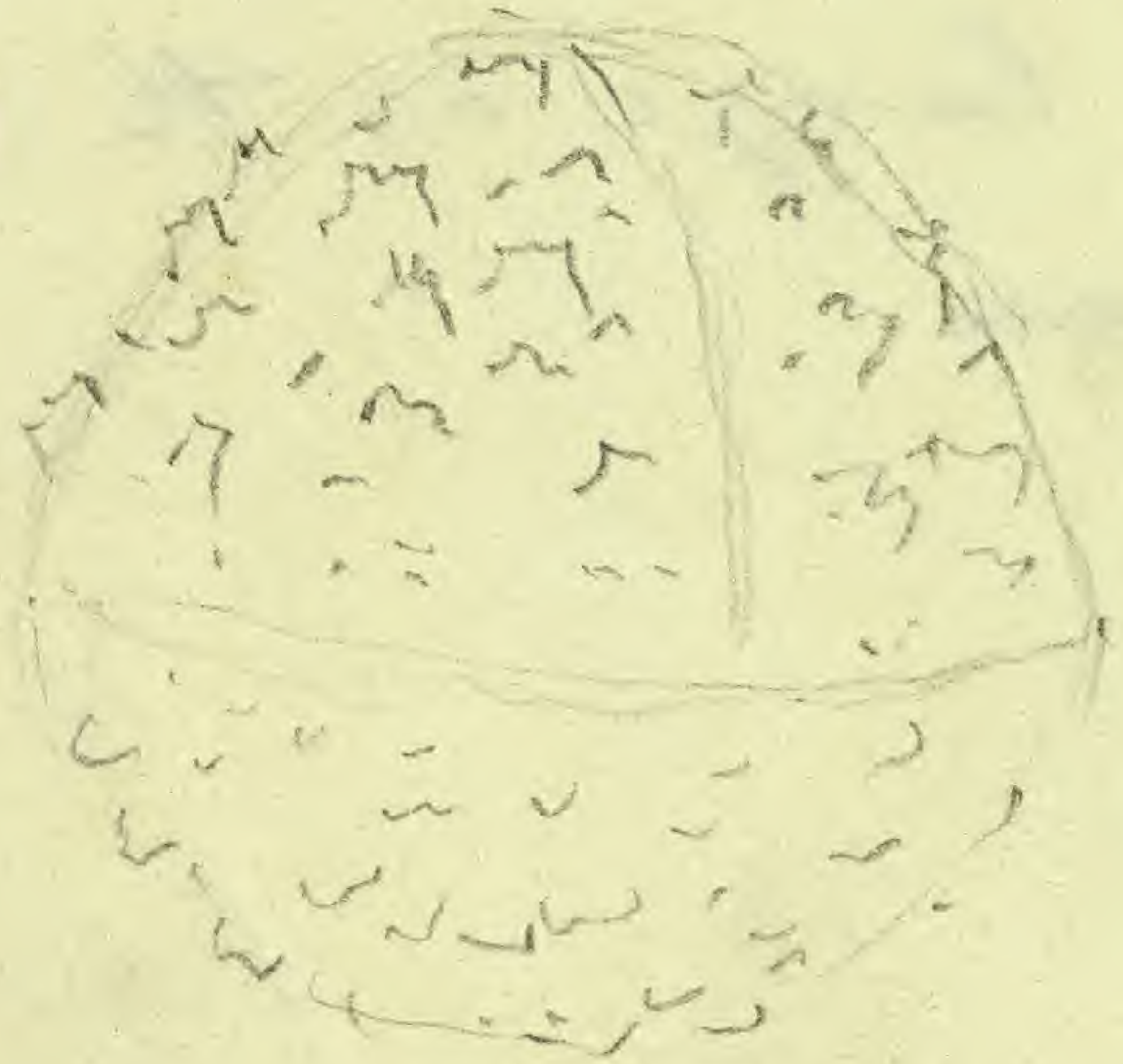
$\frac{33-40.3}{60} = 0.55 - 0.67$ mm

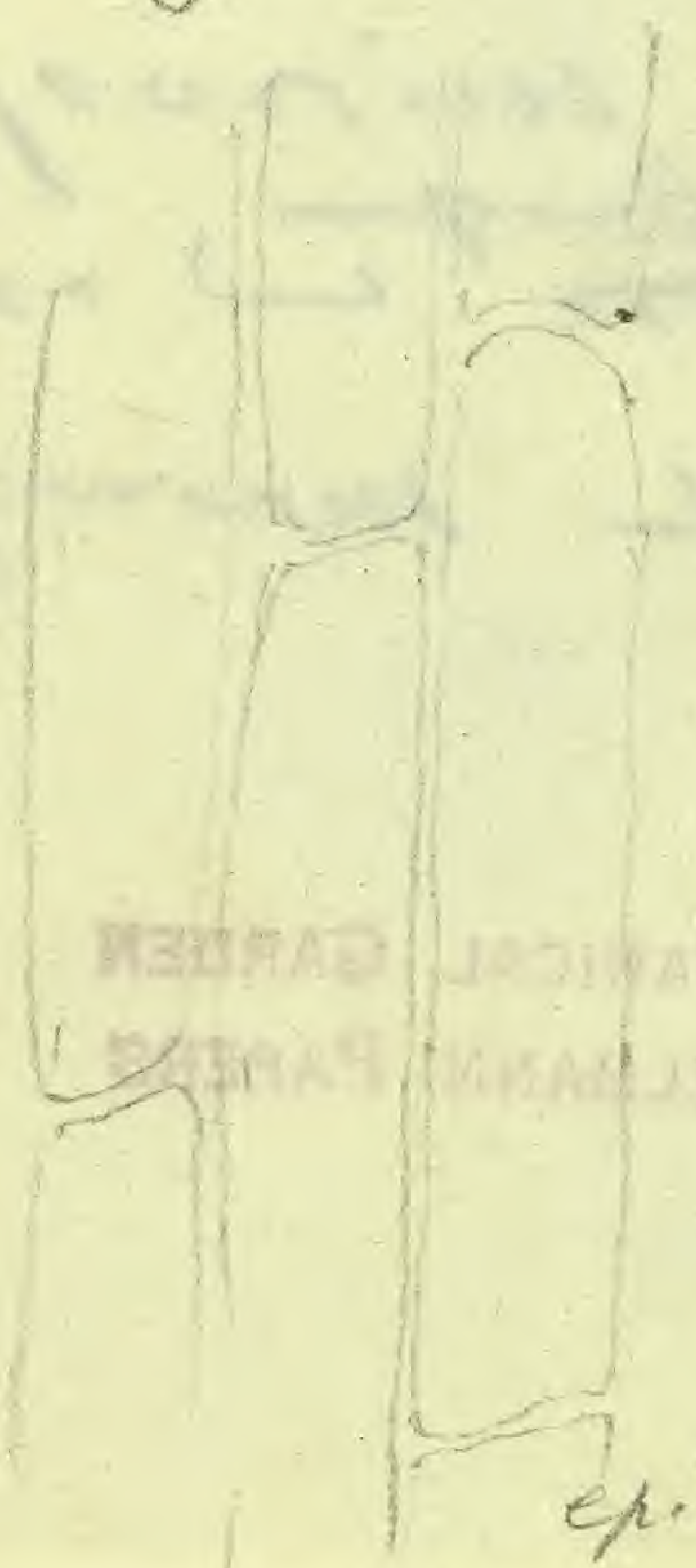


$\frac{16-20}{415} = 0.039 - 0.048$ mm

×10







coarse

texture

over

epiderm ×280 no stomata

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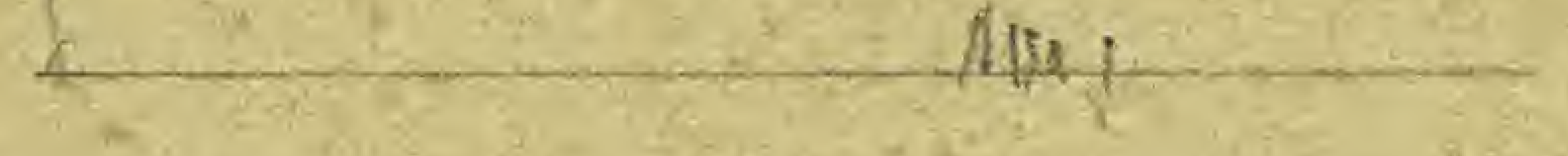
In size of macrospores this is equal to Brattleborough specimens and more like European specimens than our macrospores;

but microspores are larger than ~~these~~ European and as large as the largest macrospores

Isoetes

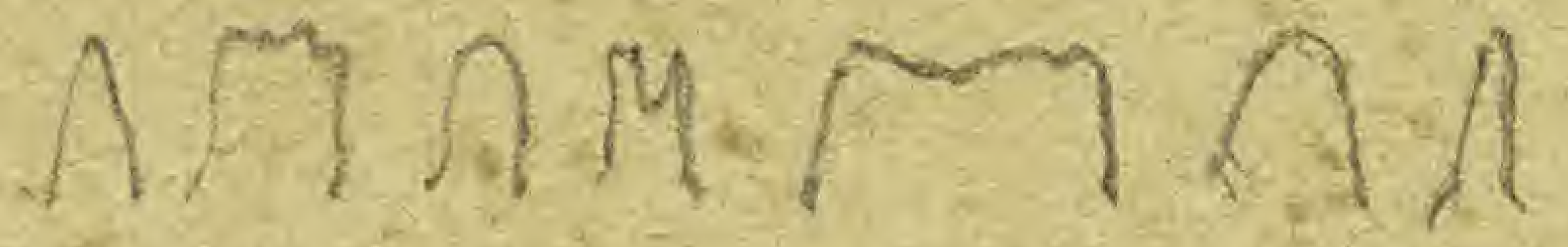
March 16 1880

Greenland, J. Vahl = Hb. Mus Senkenberg



$\frac{22,5-25}{60} = 0,37-0,42$ mm

$\frac{10.3-12}{60} = 0.17-0.20$ lin



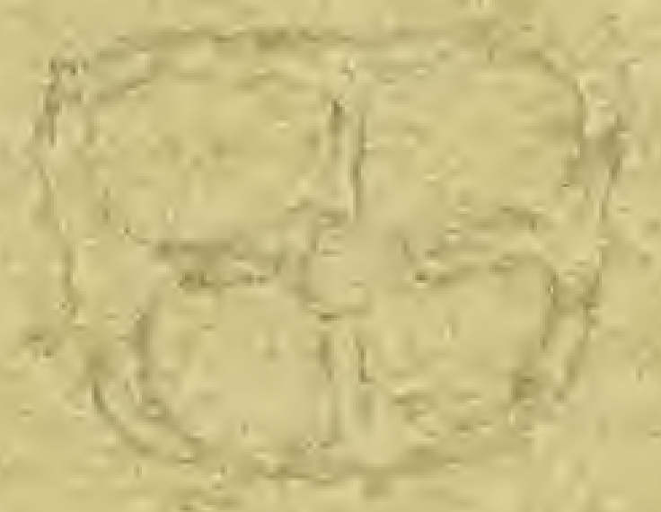
spicules of macrospores, sometimes confluent and forming cristae

× 150

Plant scarcely 2 inches high with slender leaves, 8-10 only

I could find no stomata, notwithstanding great exertion.

× 10



leaves only 1 mm thick.

13598

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